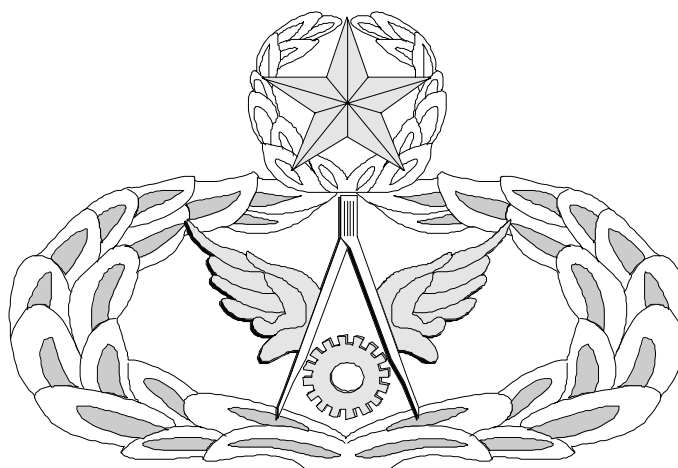


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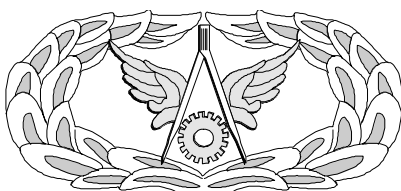
CFETP 3E1X1
Parts I and II
1 July 2002

AFSC 3E1X1

**HEATING, VENTILATION, AIR CONDITIONING,
AND REFRIGERATION**



MASTER



BASIC



SENIOR

**CAREER FIELD
EDUCATION AND TRAINING PLAN**

**CAREER FIELD EDUCATION AND TRAINING PLAN
HEATING VENTILATION, AIR CONDITIONING,
AND REFRIGERATION SPECIALTY
3E1X1**

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PREFACE

1. This Career Field Education and Training Plan (CFETP) is a comprehensive education and training document that identifies life-cycle education/training requirements, training support resources, and minimum core task requirements for this specialty. The CFETP will provide personnel a clear career path to success and instill rigor in all aspects of career field training.

2. The CFETP consists of two parts used by supervisors to plan, manage, and control training within the career field.

2.1. **Part I** provides information necessary for overall management of the specialty.

2.1.1. **Section A** provides general information about how the CFETP will be used.

2.1.2. **Section B** identifies career field progression information, duties and responsibilities, training strategies, and career field path.

2.1.3. **Section C** associates each skill level with specialty qualifications (knowledge, education, and training).

2.1.4. **Section D** indicates resource constraints.

2.1.5. **Section E** identifies transition training guide requirements for SSgt through MSgt.

2.2. **Part II** includes the following:

2.2.1. **Section A** identifies the Specialty Training Standard (STS) to include duties, tasks, and technical references to support Air Education and Training Command (AETC)-conducted training, wartime course, and correspondence course requirements.

2.2.2. **Section B** contains the course objective list and training standards supervisors will use to determine if airmen satisfy training requirements.

2.2.3. **Section C** identifies available support materials. Air Force Qualification Training Packages (AFQTPs) and CerTests support both Upgrade Training (UGT) and qualification training.

2.2.4. **Section D** identifies a training course index supervisors can use to determine resources available to support training. Included here are both mandatory and optional courses, and exportable courseware.

2.2.5. **Section E** identifies MAJCOM-unique training requirements supervisors can use to determine additional training required for the associated qualification needs.

2.2.6. **Section F** identifies home station training references and courses material required for this specialty in support of contingency/wartime training.

3. Using guidance provided in the CFETP will ensure individuals in this specialty receive effective and efficient training at the appropriate point in their careers. This plan will enable us to train today's work force for tomorrow's jobs. At unit level, supervisors and trainers will use Part II to identify, plan, and conduct training commensurate with the overall goals of this guide.

ABBREVIATIONS/TERMS EXPLAINED

Advanced Distributive Learning (ADL). Anytime, anyplace learning within DoD consisting of instructional modules comprised of sharable content objectives in an Internet/Intranet environment.

Advanced Training (AT). A formal course which provides individuals who are qualified in one or more positions of their Air Force Specialty (AFS) with additional skills/knowledge to enhance their expertise in the career field. Training is for selected career airmen at the advanced level of the AFS.

Air Force Career Field Manager (AFCFM). An individual on the Air Staff charged with the responsibility for overseeing all training and career field management aspects of an Air Force specialty or group of specialties.

Air Force Job Qualification Standard/Command Job Qualification Standard (AFJQS/CJQS). A comprehensive task list that describes a particular job type or duty position. Used by supervisors to document task qualifications. The tasks on the AFJQS/CJQS are common to all persons serving in the described duty position.

Air Force Qualification Training Package (AFQTP). An instructional package designed for use at the unit to qualify, or aid qualification, in a duty position or program, or on a piece of equipment. AFQTPs identify the Air Force's standardized method for performing the task. The AFQTP may be printed (paper-based), computer-based, or in other audiovisual media.

Career Field Education and Training Plan (CFETP). A comprehensive, multipurpose document encapsulating the entire spectrum of education and training for a career field. It outlines a logical growth plan that includes training resources and is designed to make career field training identifiable, to eliminate duplication, and to ensure this training is budget defensible.

Certification and Testing (CerTest). A multi-media evaluation program used to test an individual's knowledge of principles and procedures in their career field.

Commercial Off The Shelf (COTS). Commercially-procured training products.

Computer-Based Training (CBT). A self-paced stand-alone computer product used to deliver interactive subject and task knowledge.

Continuation Training. Additional training exceeding requirements with emphasis on present and future duty assignments.

Core Task. A task Air Force Career Field Managers (AFCFMs) identified as a minimum qualification requirement within an Air Force specialty or duty position. These tasks exemplify the essence of the career field.

Course Objective List (COL). A publication derived from initial/advanced skills course training standard, identifying the tasks and knowledge requirements, and respective standards provided to achieve a 3-, 5-, and 7-skill level in this career field. Supervisors use the COL to assist in conducting graduate evaluations in accordance with AFI 36-2201, Developing, Managing, and Conducting Training.

Critical Task. Tasks that have been identified by the work center supervisor as having a detrimental effect on mission accomplishment if not performed correctly. Critical tasks may or may not be the same as core tasks but are mandatory if identified as 'critical' to the individual's position by the supervisor or work center.

Diamond Tasks (♦). Diamond tasks are extremely important to the career field. Diamond tasks are the same as core tasks with one exception--equipment shortfalls at most locations have created problems with the actual hands-on certification of these tasks. In instances where required equipment is not available for instruction, completion of the task's AFQTP and passing the corresponding CerTest is all that is required for upgrade and qualification training. Hands-on certification should be accomplished at the first opportunity when equipment is available.

Distance Learning (DL). Includes Video Teleseminar (VTS), Video Teletraining (VTT), and Computer-Based Training (CBT). Formal courses that a training wing or a contractor develops for export to a field location (in place of resident training) for trainees to complete without the on-site support of the formal school instructor. For instance, courses are offered by Air Force Institute of Technology, Air University, and Training Detachment.

Duty Position Task. The tasks assigned to an individual for the position currently held. These include as a minimum all core tasks, critical tasks, and any other tasks assigned by the supervisor.

Enlisted Specialty Training (EST). A mix of formal training (technical school) and informal training (on-the-job) to qualify and upgrade airmen in each skill level of a specialty.

Exportable Training. Additional training via computer-assisted, paper text, interactive video, or other necessary means to supplement training.

Field Technical Training (Type 4). Special or regular on-site training conducted by a Field Training Detachment (FTD) or by a Mobile Training Team (MTT).

Initial Skills Training. AFS-specific training an individual receives upon entry into the Air Force or upon retraining into this specialty for award of the 3-skill level. Normally, this training is conducted by AETC at one of the technical training wings.

Instructional System Development (ISD). A deliberate and orderly, but flexible, process for planning, developing, implementing, and managing instructional systems. It ensures personnel are taught in a cost-efficient way the knowledge, skills, and attitudes essential for successful job performance.

Mission Ready Airmen (MRA) Training. Initial skills training allowing airmen to perform select tasks unsupervised equal to 3-levels with one year of experience.

Occupational Survey Report (OSR). A detailed report showing the results of an occupational survey of tasks performed within a particular AFS.

On-the-Job Training (OJT). Hands-on, over-the-shoulder training conducted to certify personnel in both upgrade (skill-level award) and job qualification (duty position certification) training.

Optimal Training. The ideal combination of training settings resulting in the highest levels of proficiency on specified performance requirements within the minimum time possible.

Proficiency Training. Additional training, either in-residence, exportable advanced training courses, or on-the-job training provided to personnel to increase their skills and knowledge beyond the minimum required for upgrade.

Qualification Training (QT). Actual hands-on task performance training designed to qualify an individual in a specific duty position. This portion of the dual channel on-the-job training program occurs both during and after the upgrade training process. It is designed to provide the performance skills required to do the job.

Readiness Training Package (RTP). Establishes standard levels of knowledge and proficiency for common Disaster Preparedness and Readiness subject areas by providing instructors with training references, materials, and lesson objectives used in teaching and evaluating the course subject matter.

Representative Sites. Typical organizational units having similar missions, weapon systems or equipment, or a set of jobs, used as a basis for estimating average training capacities and costs within the Training Impact Decision System (TIDES).

Resource Constraints. Resource deficiencies, such as money, facilities, time, manpower, or equipment that precludes desired training from being delivered.

Skills Training. A formal course resulting in the award of a skill level.

Specialty Training. A mix of formal training (technical school) and informal training (on-the-job) to qualify and upgrade airmen in the award of a skill level.

Specialty Training Standard (STS). Describes skills and knowledge that airmen in a particular AFS need on the job. It further serves as a contract between the Air Education and Training Command (AETC) and the user to show the overall training requirements for an AFS taught in the resident and nonresident courses.

Spin-up Training. Training required just prior to a select deployment that delivers training necessary for mission accomplishment. It is typically predicated on hard to attain contingency skills.

Standard. An exact value, a physical entity, or an abstract concept, established and defined by authority, custom, or common consent to serve as a reference, model, or rule in measuring quantities or qualities, establishing practices or procedures, or evaluating results;. a fixed quantity or quality.

Supplemental Training. Training for a portion of an AFS without a change in AFSC. Formal training on new equipment, methods, and technology that are not suited for on-the-job training.

Total Force. All collective Air Force components (active duty, Reserve, Guard, and civilian elements) of the United States Air Force.

Training Capacity. The capability of a training setting to provide training on specified requirements, based on the availability of resources.

Training Impact Decision System (TIDES). A computer-based decision support technology designed to assist Air Force Career Field Managers (AFCFMs) in making critical judgments relevant to what training should be provided to personnel within career fields, when training should be provided (at what career points), and where training should be conducted (training setting). A TIDES template is used Air Force-wide for standardization and formatting of CFETPs.

Training Planning Team (TPT). Comprised of the same personnel as a U&TW; however, TPTs are more intimately involved in training development and the range of issues is greater than is normal in the U&TW forum.

Training Requirements Analysis. A detailed analysis of tasks for a particular AFS to be included in the training decision process.

Upgrade Training (UGT). Identifies the mandatory courses, task qualification requirements, and correspondence course completion requirements for award of the 5-, 7-, and 9-skill levels.

Utilization and Training Workshop (U&TW). A forum of the AFCFM, MAJCOM Functional Managers (MFMs), Subject Matter Experts (SMEs), and AETC training personnel that determines career ladder training requirements.

PART I

SECTION A - GENERAL INFORMATION

1. Purpose. This CFETP provides information necessary for the Air Force Career Field Managers (AFCFMs), MAJCOM functional managers (MFMs), commanders, education and training managers, supervisors/trainer, and certifiers to plan, develop, manage, and conduct an effective career field training program. This plan outlines the training individuals require to develop and progress throughout their careers. It identifies initial skills, upgrade, qualification, advanced, and proficiency training.

1.1. Initial skills training. Is the AFS-specific training an individual receives upon entry into the Air Force or upon retraining into this specialty for award of the 3-skill level. Normally, this training is conducted by AETC at one of the technical training wings.

1.2. Upgrade training. Identifies the mandatory courses, task qualification requirements, and correspondence course completion requirements for award of the 5-, 7-, and 9-skill levels.

1.3. Qualification training. Is actual hands-on task performance training designed to qualify an airman in a specific duty position. This training program occurs both during and after the upgrade training process. It is designed to provide the performance skills/knowledge required to do the job.

1.4. Advanced training. Is a formal course that provides individuals who are qualified in one or more positions of their Air Force Specialty (AFS) with additional skills/knowledge to enhance their expertise in the career field. Training is for selected career airmen at the advanced level of the AFS.

1.5. Proficiency training. Is additional training, either in-residence, exportable advanced training courses, or on-the-job training, provided to personnel to increase their skills and knowledge beyond the minimum required for upgrade.

2. The CFETP has several purposes:

2.1. Serves as a management tool to plan, manage, conduct, and evaluate a career field training program. It is used to help supervisors identify training at the appropriate point in an individual's career.

2.2. Identifies task and knowledge training requirements for each skill level in the specialty and recommends education/training throughout each phase of an individual's career.

2.3. Lists training courses available in the specialty and identifies sources of training and training delivery methods.

2.4. Identifies major resource constraints that impact full implementation of the desired career field training process.

3. Uses. MFMs and supervisors will use the plan at all levels to ensure comprehensive and cohesive training programs are available for each individual in the specialty.

3.1. AETC training personnel will develop/revise formal resident, nonresident, field, and exportable training based on requirements established by the users and documented in Part II of the CFETP. They will also work with the AFCFM, Air Force Civil Engineer Support Agency Force Development Division (HQ AFCEA/CEOF) to develop acquisition strategies for obtaining resources needed to provide the identified training.

3.2. MFMs will ensure their training programs complement CFETP mandatory initial, upgrade, and proficiency requirements and identify requirements that can be satisfied by OJT, resident training, contract training, CerTest, or exportable courses. MAJCOM-developed training to support this AFS must be identified for inclusion into the plan.

3.3. Unit Education and Training managers and supervisors must ensure each individual completes the mandatory training requirements (including MAJCOM supplemental requirements) for the upgrade training specified in this plan.

3.4. Each individual will complete the mandatory training requirements specified in this plan. The lists of courses in Part II in this CFETP will be used as a reference to support training.

4. Coordination and Approval. The AFCFM is the approval authority for the CFETP. MAJCOM representatives and AETC personnel will identify and coordinate on the career field training requirements. The AETC training manager for this specialty will initiate an annual review of this document by AETC and MFMs to ensure currency and accuracy. Using the list of courses in Part II, they will eliminate duplicate training.

SECTION B - CAREER FIELD PROGRESSION AND INFORMATION

5. Specialty Descriptions. Heating, Ventilation, Air Conditioning, and Refrigeration (HVAC/R) Apprentice, Journeyman, Craftsman, and Superintendent

5.1. Specialty Summary. Installs, operates, maintains, and repairs heating, ventilation, air conditioning, and refrigeration (HVAC/R) systems, combustion equipment, and industrial air compressors. Maintains and repairs non-electric kitchen equipment. Manages HVAC/R functions and activities. Related DoD Occupational subgroup: 720.

5.2. Duties and Responsibilities for Apprentice, Journeyman, and Craftsman.

5.2.1. Installs and operates HVAC/R systems and equipment

5.2.1.1. Interprets drawings and schematics and installs HVAC/R components.

5.2.1.2. Installs, repairs, fabricates, and tests piping and tubing systems.

5.2.1.3. Installs, connects, troubleshoots, and maintains HVAC/R controls

5.2.1.4. Tests HVAC/R equipment for proper operation.

5.2.1.5. Balances air and water in HVAC systems.

5.2.1.6. Monitors systems operation to ensure efficiency and compliance with technical orders, manufacturer handbooks, local procedures, codes, and directives.

5.2.1.7. Evaluates water treatment for heating and cooling systems.

5.2.1.8. Ensures compliance with safety and environmental regulations for fuels, refrigerants, and hazardous materials

5.2.2. Maintains and repairs HVAC/R equipment and systems.

5.2.2.1. Performs recurring maintenance and seasonal overhaul on systems and components

5.2.2.2. Uses drawings and schematics to analyze and isolate system malfunctions.

5.2.2.3. Troubleshoots malfunctions using technical orders, manufacturer's handbooks, local procedures, codes, and directives.

5.2.2.4. Repairs or replaces components.

5.2.2.5. Modifies equipment for specific missions or to increase efficiency.

5.2.2.6. Maintains tools and equipment. Maintains shop tools and equipment. Calibrates test equipment to ensure accuracy.

5.2.3. Advises on problems with HVAC/R equipment and systems

5.2.3.1. Solves complex maintenance problems by studying layout drawings, wiring and schematic drawings, and by analyzing construction and operating characteristics.

5.2.3.2. Develops and establishes operation and maintenance procedures to ensure maximum efficiency.

5.2.4. Plans and performs facilities surveys.

5.2.4.1. Surveys proposed work to determine resource requirement.

5.2.4.2. Prepares cost estimates for in-service work.

5.2.4.3. Applies engineered performance standards to plan and estimate jobs.

5.2.4.4. Coordinates plans and other activities with other civil engineer sections and other base agencies

5.2.5. Performs inspection activities.

5.2.5.1. Attends site visits.

5.2.5.2. Performs pre-acceptance inspections of HVAC/R systems.

5.3. Duties and Responsibilities for Superintendent. Advises on problems associated with the installation and repair of utility equipment and systems.

5.3.1. Solves complex maintenance problems by studying layout drawings, wiring and schematic drawings, and by analyzing construction and operating characteristics.

5.3.2. Develops and establishes operation and maintenance procedures to ensure maximum efficiency Submits and reviews supply and equipment requisitions.

6. Skill/Career Progression. Adequate training and timely progression from the apprentice to the superintendent skill level play an important role in the Air Force's ability to accomplish its mission. It is essential that everyone involved in training do his or her part to plan, manage, and conduct an effective training program. The guidance provided in this part of the CFETP will ensure individuals receive viable training at appropriate points in their careers.

6.1. Apprentice (3-Level).

6.1.1. Upon completion of initial skills training, a trainee will work with a trainer to enhance their knowledge and skills.

6.1.2. Utilize the Career Development Course (CDC), Air Force Qualification Training Packages (AFQTPs) and other exportable courses for subject and task fundamentals in the career field. Successfully complete applicable CerTests.

6.1.3. Once trained and task certified, a trainee may perform the task unsupervised.

6.1.4. After all upgrade training requirements are completed, supervisors and Unit Education and Training Managers (UETMs) coordinate upgrade procedures.

6.1.5. NOTE: All trainees are automatically enrolled in the Community College of the Air Force (CCAF) when awarded their primary AFSC.

6.2. Journeyman (5-Level).

6.2.1. Enter into continuation training to broaden experience base.

6.2.2. 5-Levels may be assigned job positions such as team leader and shift supervisor.

6.2.3. Will attend the Airman Leadership School (ALS) after serving 48 months in the Air Force (active duty only). Either the in-residence or correspondence course is required for Air Reserve Component (ARC) personnel.

6.2.4. Will use CDCs and other reference material to prepare for Weighted Airman Performance Systems (WAPS) testing.

6.2.5. Should continue pursuing a CCAF degree.

6.2.6. After all upgrade training requirements are complete, supervisors and UETMs coordinate upgrade procedures.

6.3. Craftsman (7-Level).

6.3.1. Completion of Read-Ahead Material (RAM), 100% core/diamond task completion, and resident graduation from the 7-level resident course are basic prerequisites for award of the 7-level.

6.3.2. A craftsman may expect to fill various supervisory and management positions such as shift leader, mobility team chief, production supervisor, or task certifier.

6.3.3. Seven-levels should take continuation training courses or obtain additional knowledge on management of resources and personnel.

6.3.4. Continued academic education through CCAF and higher degree programs is encouraged.

6.3.5. Will attend the Noncommissioned Officer Academy (NCOA) after promotion to TSgt (active duty only). Either the in-residence or correspondence course is required for ARC personnel.

6.3.6. After all upgrade training requirements are complete, supervisors and UETMs coordinate upgrade procedures.

6.4. Superintendent (9-Level).

6.4.1. Must be a SMSgt for award of the 9-skill level.

6.4.2. A 9-level can be expected to fill positions such as flight chief, zone superintendents, and various staff positions.

6.4.3. Should pursue increased knowledge of budget, manpower, resources, and personnel management.

6.4.4. Recommend the pursuit of additional higher education and completion of courses outside of their career AFS.

6.5. Civil Engineer Manager.

6.5.1. Must be selected for CMSgt and possess qualifications in a feeder specialty (3E090, 3E191, 3E291, 3E391, 3E490, 3E591, or 3E691).

6.5.2. Will work in a variety of similar jobs and functional areas where general managerial and supervisory abilities can be most effectively used and challenged.

6.5.3. Resident graduation of the USAF Senior NCO Academy (SNCOA) is a prerequisite for CMSgt sew-on (active duty only). In residence or correspondence course required for ARC personnel.

7. Training Decisions. The CFETP uses a building block approach (simple to complex) to encompass the entire spectrum of training requirements for the HVAC/R career field. The spectrum includes a strategy for when, where, and how to meet the training requirements. The strategy must be apparent and affordable to reduce duplication of training and eliminate a disjointed approach to training. The following decisions were made at the career field Utilization & Training Workshop (U&TW) held at Sheppard AFB, TX in Dec 1999.

7.1. Initial Skills Training. The initial skills course was reviewed for content. Additions, deletions, and modifications were made to the course. Wartime training tasks were identified. Additional contingency training was also identified.

7.2. Five-Level Upgrade Training Requirements. Existing CDCs were reviewed and scrubbed to ensure only current material remained and new technology information was added.

7.3. Seven-Level Upgrade Training Requirements. Seven-level training requirements were reviewed.

7.4. Proficiency Training.

7.4.1. Any additional knowledge and skill requirements that were not taught through initial skills or upgrade training are assigned as continuation training.

7.4.2. Purpose of continuation training is to provide training exceeding minimum upgrade training requirements with emphasis on present and future duty positions.

7.4.3. MAJCOMs must develop a continuation-training program that ensures individuals in the HVAC/R career field receive the necessary training at the appropriate point in their careers.

7.4.4. The training program will identify both mandatory and optional training requirements.

7.5. Supplemental Training. Subject Matter Experts (SMEs) and the Training Committee reviewed supplemental training courses for technical accuracy and identified training that was no longer required. They revalidated the remaining courses as necessary to fully support career progression in the AFS.

7.6. CerTest. Originally, the CerTest program was developed to support transition training, and meet DoD certification requirements. Now, it is also the singular platform to launch AFQTP tests and supplement the evaluation of OJT.

8. Community College of the Air Force (CCAF) Academic Programs. Airmen are automatically enrolled in CCAF upon completion of basic military training. CCAF provides the opportunity to obtain an Associates in Applied Sciences Degree. In addition to its associates degree program, CCAF offers the following:

8.1. Occupational Instructor Certification. Upon completion of instructor qualification training (consisting of the Instructor Methods course and supervised practice teaching), CCAF instructors possessing an associates degree or higher may be nominated by their school commander/commandant for certification as an occupational instructor.

8.2. Trade Skill Certification. When a CCAF student separates or retires, a trade skill certification is awarded for the primary occupational specialty. The College uses a competency-based assessment process for trade skill certification at one of four proficiency levels: Apprentice, Journeyman, Craftsman/Supervisor, or Master Craftsman/Manager. All are transcribed on the CCAF transcript.

8.3. The Mechanical and Electrical Technology Associates Degree (4VGA) applies to AFSC 3E1X1.

8.3.1. Degree Requirements. Prior to completing an Associates Degree, the individual must be awarded a 5-level and the following requirements must be met:

Course	Semester Hours
Technical Education	24
Leadership, Management, and Military Studies	6
Physical Education	4
General Education	15
Program Elective	15
Technical Education; Leadership, Management, and	

Military Studies; or General Education

Total

64

8.3.2. Technical Education. (24 Semester Hours) A minimum of 12 semester hours of Technical Core subjects/courses must be applied and the remaining semester hours applied from Technical Core/Technical Elective courses.

Technical Core Requirements	Semester Hours
CCAF Internship	16
Electrical Power Production	20
Electrical Systems	20
Heating Systems	20
Refrigeration and Air Conditioning	20

Technical Electives	Semester Hours
AF Enlisted Professional Military Education	12
Air Distribution and Filtering Systems	3
Alternate Heating and Cooling	3
Blueprint Reading/Schematic Diagrams	6
Building Codes and Ordinance	3
Computer Science	6
Control Systems/Maintenance	6
Electronics	6
Engine Principles	3
Environmental Awareness	3
Environmental Compliance	3
Industrial Management	3
Industrial Safety	3
Motor, Starter, and Control Devices	6
Quality Assurance	3
Technical Mathematics (College Algebra or Higher)	3
Technical Physics	4
Technical Writing	3
Welding and Pipefitting	3

8.3.3. Leadership, Management, and Military Studies (6 Semester Hours).

Professional military education and civilian management courses accepted in transfer. Credit is also earned by testing.

8.3.4. Physical Education (4 Semester Hours). This requirement is satisfied by completion of PHE 1000- Basic Training.

8.3.5. General Education (15 Semester Hours). Applicable courses must meet the criteria for application of courses to the General Education Requirements (GER) and be in agreement with the definitions of applicable general education subjects/courses as provided in the CCAF General Catalog.

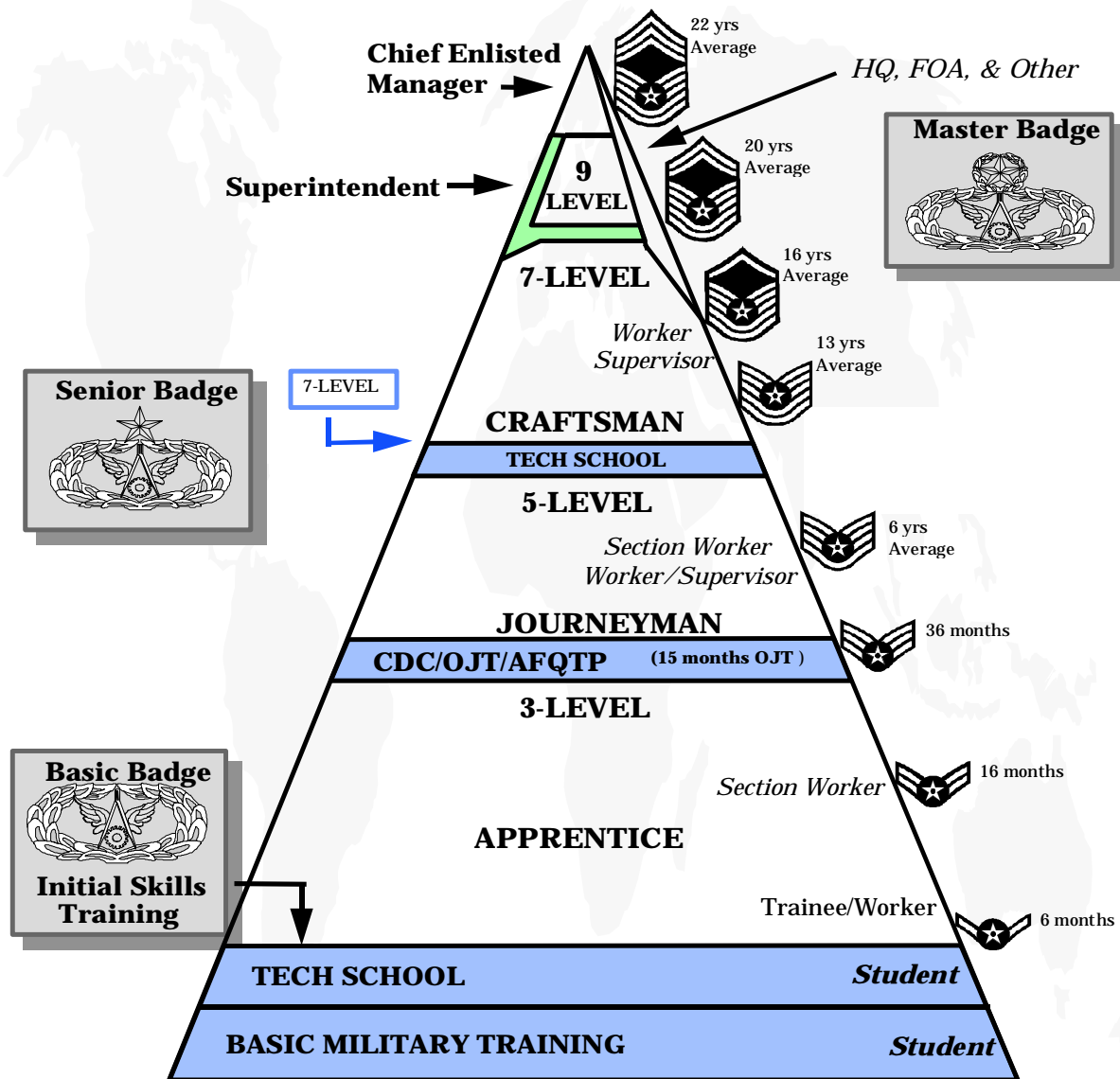
General Education	Semester Hours
Oral Communication Speech	3
Written Communication English Composition	3
Mathematics An intermediate algebra or a college-level mathematics course that satisfies the delivering institution's mathematics requirement for graduation. If an acceptable mathematics course is applied as a Technical or Program Elective, a natural science course may be substituted for mathematics.	3
Social Science Anthropology, Archaeology, Economics, Geography, Government, History, Political Science, Psychology, Sociology	3
Humanities Fine Arts (criticism, appreciation, historical significance), foreign language, literature, philosophy, religion	3

8.3.6. Program Elective (15 Semester Hours). Courses applicable to the technical education; leadership, management, and military studies; or general education requirements. Natural science courses that meet the general education requirement (GER) application criteria. Foreign language credit earned at the Defense Language Institute or through the Defense Language Proficiency Test. A maximum of six semester hours of CCAF degree-applicable technical course credit otherwise not applicable to this program of enrollment. See the CCAF General Catalog for details regarding the Associates of Applied Science for this specialty.

8.4. Additional off-duty education is a personal choice that is encouraged for all. Individuals desiring to become an AETC Instructor should actively pursue an Associates Degree. A qualified faculty is necessary to maintain accreditation through the Southern Association of Colleges and Schools.

9. **Career Field Path.** The following chart depicts this specialty's career path.

HVAC/R Enlisted Career Pyramid



9.1. Enlisted Career Path.

Table: Enlisted Career Path				
Education and Training Requirements	GRADE REQUIREMENTS			
	Rank	Average Sew-On	Earliest Sew-On	High Year Of Tenure (HYT)
Basic Military Training school				
Apprentice Technical School (3-Skill Level)	Amn A1C	6 months 16 months		
Upgrade To Journeyman (5-Skill Level) -- Complete all core and duty-related tasks identified in CFETP. - Minimum 15 months on-the-job training (9 months for retrainees) - Complete appropriate CDC if/when available.	SrA	3 years	28 months	10 Years
Airman Leadership School (ALS) - Must be a SrA with 48 months time in service or be a SSgt Selectee. - Resident graduation is a prerequisite for SSgt sew-on (Active Duty Only).	<u>Trainer</u> - Trainer must be qualified and certified on tasks to be trained. - Must attend formal AF Training Course and be appointed by Commander in writing.			
Upgrade To Craftsman (7-Skill Level) - Complete all core and duty-related tasks identified in CFETP - Minimum rank of SSgt - 12 months OJT - Complete appropriate CDC if/when available. - Attend 7-level Craftsman Course (may attend prior to completion of 12 months UGT) - Must complete Read-Ahead Material (RAM) prior to attending.	SSgt	6 years	3 years	20 Years
Retrainee - Minimum 9 months for 5-level - Minimum 12 months for 7-level UGT	<u>Certifier</u> - SSgt with 5-skill level or civilian equivalent. - Attend formal AF Certifier Course and appointed by Commander in writing. - Be a person other than the trainer (for core and critical tasks only).			
Noncommissioned Officer Academy (NCOA) - Must be a TSgt or TSgt Selectee - Resident graduation is a prerequisite for MSgt sew-on (Active Duty Only).	TSgt	13 years	5 years	20 Years
	MSgt	16 years	8 years	24 Years
Upgrade To Superintendent (9-Skill Level) - Minimum rank of SMSgt	SMSgt	20 years	11 years	26 Years
Civil Engineer Manager (CEM) -USAF Senior NCO Academy (SNCOA) resident graduation is a prerequisite for CMSgt sew-on (Active Duty Only)	CMSgt	22 years	14 years	30 years

9.2. CE Occupational Badge. The Civil Engineer badge reflects a great history and tradition. By wearing it, you will be recognized by your fellow airmen as having achieved an expected level of competence. The multitude of engineers before you established this expectation through excellent service in both peace and war. Eligibility criteria for award and wear of AF occupational badges can be found in AFI 36-2923 (Aeronautical, Duty, and Occupational Badges), on the AFEPL, Air Force Electronic Publications Library (AFEPL).

9.2.1. CE Badge Heraldry. The gear wheel and compass have historically been used to represent the engineering profession, in both the military and civilian sector. The gear represents the essence of engineering: applying scientific principles and technology to practical ends. To Air Force engineers, the gear symbolizes an element (representing the built environment) that meshes with other environments (weapon systems and trained personnel) to enable the Air Force to perform its mission. The compass is a precision tool historically used by engineers in designing and constructing facilities and equipment. The gear and compass together symbolize all the diverse specialties within Air Force civil engineer. Finally, the wings help to portray the fundamental linkage between the engineering and aviation components; and that the built environment is the foundation supporting Air Force mission and people.

9.2.1.1. Basic Badge. The basic badge is awarded upon successful completion of the apprentice course.

9.2.1.2. Senior Badge. The senior badge adds a star to the top of the badge. This is awarded after the member successfully completes the 7-level awarding course.

9.2.1.3. Master Badge. The master badge adds a wreath around the star. It's awarded to master sergeant or above with 5 years in the specialty from award of the 7-skill level.

SECTION C – SKILL-LEVEL TRAINING REQUIREMENTS

10. Purpose. The various skill levels in the career field are defined in terms of tasks and knowledge requirements for the HVAC/R career ladder. They are stated in broad, general terms and establish the standards of performance. An all-encompassing core task list has been developed for this specialty because of the diversity of the missions supported and the equipment installed to meet mission requirements. Core tasks (and diamond tasks as applicable), knowledge items, and skill requirements for this specialty are identified in the STS. Completion of the mandatory 3-level awarding course, the mandatory completion of CDCs, the mandatory completion of applicable AFQTPs and CerTests, and the mandatory 7-level Craftsman course, comprise Air Force requirements.

11. Skill-Level Training Requirements.

11.1. Apprentice (3-Level) Training Requirements.

11.1.1. Specialty Qualifications.

11.1.1.1. Knowledge. Completion of the Apprentice course satisfies this mandatory requirement.

11.1.1.2. Education. Completion of high school or general education development (GED) with courses in mathematics, general science, physics, shop mechanics, electricity, and computer fundamentals is desirable.

11.1.1.3. Training. Completion of the HVAC/R Apprentice Course, J3ABR3E131 006, is mandatory for award of this skill level.

11.1.1.4. Experience. N/A

11.1.1.5. Other.

11.1.1.5.1. Normal color vision as defined in AFMAN 48-123, Medical Examination and Standards

11.1.1.5.2. Qualification to operate government vehicles according to AFMAN 24-301, Vehicle Operations.

11.1.2. Training Sources/Resources.

11.1.2.1. Formal training is accomplished through course J3ABR3E131 006, at Sheppard AFB, TX.

11.1.2.2. The COL (Part II, Section B of this CFETP) identifies all the knowledge and tasks, with their respective standards.

11.1.2.3. When applicable, AFQTPs and associated CerTests are mandatory for use during UGT/QT on all core tasks, critical tasks, and diamond (◆) tasks.

11.1.3. Implementation.

11.1.3.1. The 3-skill level is awarded upon graduating the Apprentice course.

11.2. Journeyman (5-Level) Training Requirements.

11.2.1. Specialty Qualification. Entry into 5-level upgrade training is initiated after the individual has completed the 3-level school. All 3-level qualifications apply to 5-level requirements.

11.2.1.1. Knowledge. Knowledge of the following is mandatory:

11.2.1.1.1. Principles of HVAC/R systems, controls, and components.

11.2.1.1.2. Combustion systems.

11.2.1.1.3. Air and water balancing.

11.2.1.1.4. Non-electric kitchen equipment.

11.2.1.1.5. Industrial air compressors.

11.2.1.1.6. Interpreting drawings and schematics.

11.2.1.1.7. Fundamentals of HVAC/R equipment and troubleshooting techniques.

11.2.1.2. Education. N/A

11.2.1.3. Training

11.2.1.3.1. Completion of CDCs is mandatory.

11.2.1.3.2. Certification of all 5-level core tasks identified with a single asterisk (*) in the core task column of the STS is mandatory.

11.2.1.3.3. Completion of AFQTPs for assigned core and diamond (◆) tasks is mandatory.

11.2.1.3.4. Completion of CerTests for all diamond (◆) tasks with a minimum of 80% is mandatory.

11.2.1.3.5. Certification of duty position requirements identified by the supervisor is mandatory.

11.2.1.3.6. Completion of HVAC/R Control Systems course, J3AZR3E151 013, is optional.

11.2.1.3.7. Completion of HVAC/R Direct Expansion Systems course, J3AZR3E151 014, is optional.

11.2.1.3.8. Completion of HVAC/R Indirect Expansion Systems course, J3AZR3E151 015 is optional.

11.2.1.4. Experience.

11.2.1.4.1. Qualification in and possession of 3-skill level.

11.2.1.4.2. Operation, maintenance, and repair of HVAC/R equipment and control systems.

11.2.1.4.3. Minimum 15 months on-the-job training (9 months for re-trainees) before award of 5-skill level.

11.2.1.5. Other. N/A

11.2.2. Training Sources/Resources.

11.2.2.1. CDC 3E151, HVAC/R Journeyman.

11.2.2.2. Course J3AZR3E151 013, in residence, HVAC/R Control Systems.

11.2.2.3. Course J3AZR3E151 014, in residence, HVAC/R Direct Expansion Systems.

11.2.2.4. Course J3AZR3E151 015, in residence, HVAC/R Indirect Expansion Systems.

11.2.2.5. The STS (Part II, Section A of the CFETP) identifies all core tasks required for qualification in the individual's duty position.

11.2.2.6. Qualified trainers provide upgrade and qualification training for duty positions, managed programs, and/or equipment to be used

11.2.3. Implementation.

11.2.3.1. Entry into formal Journeyman upgrade training is accomplished after individuals are assigned to their first duty station.

11.2.3.2. Qualification training is initiated any time individuals are assigned duties they are not certified to perform.

11.2.3.3. AFQTPs are used concurrently to obtain necessary duty position qualifications.

11.3. Craftsman (7-Level) Training Requirements.

11.3.1. Specialty Qualification. All 5-level qualifications apply to 7-level requirements.

11.3.1.1. Knowledge. Knowledge is mandatory of:

11.3.1.1.1. Thermodynamics, psychometrics, and mathematics that apply to these systems.

11.3.1.1.2. Industrial water treatment.

11.3.1.1.3. Environmental regulations for fuels, refrigerants, and hazardous materials.

11.3.1.1.4. Military and commercial publications.

11.3.1.2. Education.

11.3.1.2.1. To assume the grade of SSgt, individuals must successfully complete Airman Leadership School (active duty only).

11.3.1.2.2. To assume the grade of MSgt, individuals must successfully complete the NCO Academy (active duty only).

11.3.1.2.3. For ANG/AFRC, completion of Air Force Institute for Advanced Distributive Learning (AFIADL) courses 00001 (ALS) and 00006 D&E (NCO Academy) satisfy the requirements.

11.3.1.3. Training.

11.3.1.3.1. Completion of 7-level Read Ahead Material (RAM) for course J3ACR3E070-000 is mandatory prior to attendance at the resident course.

11.3.1.3.2. Completion of in-residence CE Management Craftsman Course J3ACR3E070-000 is mandatory.

11.3.1.3.3. Certification of all 5- and 7-skill level core tasks identified with a single asterisk (*) and double asterisk (**) in the core column of the STS is mandatory.

11.3.1.3.4. Completion of all AFQTPs for assigned core and diamond (◆) tasks is mandatory.

11.3.1.3.5. Completion of CerTests for all diamond (◆) tasks with a minimum of 80% is mandatory.

11.3.1.3.6. Certification of duty position requirements identified by the supervisor is mandatory.

11.3.1.3.7. Completion of J3AZR3E151 013, in-residence course, HVAC/R Controls Systems is highly desirable.

11.3.1.3.8. Completion of J3AZR3E151 014, in-residence course, HVAC/R Direct Expansion Systems is highly desirable..

11.3.1.3.9. Completion of J3AZR3E151 015, in-residence course, HVAC/R Indirect Expansion Systems is highly desirable.

11.3.1.4. Experience.

11.3.1.4.1. Qualification in and possession of a 5-level.

11.3.1.4.2. Operation, maintenance, and repair of HVAC/R equipment and control systems.

11.3.1.4.3. Minimum 18 months on-the-job training (12 months for re-trainees) before award of 7- skill level.

11.3.1.5. Other. N/A

11.3.2. Training Sources/Resources.

11.3.2.1. Course J3ACR3E070 000 Part A, CE Management Craftsman Course Read Ahead Material (RAM)

11.3.2.2. Course J3ACR3E070-000, CE Management Craftsman.

11.3.2.3. NCO Academy Course 00006 D&E (paper-based correspondence).

11.3.2.4. Course J3AZR3E151 013, In-residence, HVAC/R Control Systems.

11.3.2.5. Course J3AZR3E151 014, In-residence, HVAC/R Direct Expansion Systems.

11.3.2.6. Course J3AZR3E151 015, In-residence, HVAC/R Indirect Expansion Systems.

11.3.2.7. The STS (Part II, Section A of this CFETP) identifies all core tasks required for qualification in the individual's duty position.

11.3.2.8. Qualified trainers provide upgrade and qualification training for duty positions, managed programs, and/or equipment to be used.

11.3.3. Implementation.

11.3.3.1. Entry into 7-level training is initiated when an individual is selected for SSgt and has fulfilled all 5-level requirements.

11.3.3.2. Qualification training is initiated any time an individual is assigned duties that they are not qualified to perform.

11.3.3.3. AFQTPs are used concurrently to obtain necessary duty position qualifications.

11.4. Superintendent (9-Level) Training Requirements.

11.4.1. Specialty Qualification.

11.4.1.1. Knowledge. Knowledge of the following is mandatory:

11.4.1.1.1. Air Force training programs.

11.4.1.1.2. HVAC/R electrical, electronic, and pneumatic control systems.

11.4.1.1.3. Interpreting wiring schematics and diagrams.

11.4.1.1.4. Safety and environmental concerns.

11.4.1.2. Education.

11.4.1.2.1. ANG/AFRC must complete AFIADL course 00005 (computer-based CD-ROM) to satisfy the Senior NCO Academy requirement.

11.4.1.3. Training. Completion of duty position training requirements.

11.4.1.4. Experience.

11.4.1.4.1. Qualification in and possession of 7-skill level is mandatory.

11.4.1.4.2. Directing functions such as inspecting, operating, maintaining, and repairing HVAC/R systems.

11.4.1.5. Other. N/A

11.4.2. Training Sources/Resources.

11.4.2.1. In-residence SNCO Academy located at Maxwell AFB - Gunter Annex AL.

11.4.2.2. SNCO Academy Course 00005 (exportable computer-based CD ROM).

11.4.3. Implementation.

11.4.3.1. Entry into 9-level training is initiated when an individual is selected for SMSgt and is a fully qualified 7-level.

11.4.3.2. QT is initiated any time an individual is assigned duties they are not qualified to perform.

11.5. Civil Engineer Manager.

11.5.1. Specialty Qualification.

11.5.1.1. Knowledge. Knowledge of the following is mandatory:

11.5.1.1.1. Managing and directing personnel resource activities.

11.5.1.1.2. Interpreting and enforcing policy and applicable directives.

11.5.1.1.3. Establishing control procedures to meet work goals and standards.

11.5.1.1.4. Recommending or initiating actions to improve operational efficiency.

11.5.1.1.5. Planning and programming work commitments and schedules.

11.5.1.1.6. Developing plans regarding facilities, supplies, and equipment procurement and maintenance.

11.5.1.2. Education. Must be a resident graduate of SNCOA (active duty only).

11.5.1.3. Training. N/A

11.5.1.4. Experience.

11.5.1.4.1. Possess qualifications in feeder specialty (3E191) prior to award of Civil Engineer Manager code 3E000.

11.5.1.4.2. Managerial ability to plan, direct, coordinate, implement, and control a wide range of work activity.

11.5.1.5. Other. N/A

11.5.2. Training Sources and Resources. N/A

11.5.3. Implementation. Entry into Civil Engineer Manager code 3E000 is initiated when an individual is selected for CMSgt and possesses qualifications in a feeder specialty (3E090, 3E191, 3E291, 3E391, 3E490, 3E591, and 3E691).

SECTION D - RESOURCE CONSTRAINTS

12. Purpose. The following paragraphs describe the resource constraints that result from publication of this CFETP. All constraints are referenced to specific STS line items shown as back slashed on the STS.

12.1. Equipment Constraints:

12.1.1. Constraints. None.

12.1.2. Time/Manpower/Student Man-years Constraints: None.

13. Apprentice (3-Level) Training.

13.1. Constraints. None.

13.1.1. Impact. Required training will be available upon implementation of this CFETP.

13.1.2. Resources Required. None.

13.1.3. Action Required. Complete revision of the 3-level course to meet all training requirements and proficiency codes identified in this CFETP.

13.2. OPR/Target Completion Date. 366 TRS/TRRT will implement revised training requirements with class 22 July 02.

14. Journeyman (5-Level) Training. AFQTP development for all core tasks.

14.1. Constraints. None.

14.1.1. Impact. Required training will be available upon implementation of this CFETP.

14.1.2. Resources Required. None.

14.1.3. Action Required. None.

14.2. Action Required. HQ AFCESA/CEOF held a workshop to develop required AFQTPs. Completed: May 2000.

15. Craftsman (7-Level) Training. AFQTPs

15.1. Constraints. None.

15.1.1. Impact. Required training will be available upon implementation of this CFETP.

15.1.2. Resources Required. None.

15.1.3. Action Required. None.

15.2. Action Required. HQ AFCESA/CEOF held a workshop to develop required AFQTPs. Completed: May 2000.

16. Superintendent (9-Level) Training. No Constraints.

SECTION E - TRANSITION TRAINING GUIDE

- 17. “There are currently no transition training requirements. This area is reserved.”**

PART II

SECTION A - SPECIALTY TRAINING STANDARD

1. Implementation. This STS will be used to identify technical training provided by AETC for the 3-level HVAC/R Systems Apprentice course with class beginning 22 July 02 and graduating 16 Dec 02. Also the 7-level Civil Engineer Management Craftsman course with class beginning 23 Jul 01 and graduating 3 Aug 01.

2. Purpose. As prescribed in AFI 36-2201, this STS:

2.1. Lists in Column 1 (*Tasks, Knowledge, and Technical Reference*) the most common tasks, knowledge, and Technical References (TRs) necessary for airmen to perform duties in the 3-, 5-, and 7-skill level.

2.2. Column 2 (*Core Tasks*) identifies core tasks (specialty-wide training requirements) by an asterisk (*) for 5- and 7- skill levels or a double asterisk (**) for 7-skill level only. **As a minimum, trainees must complete all core and critical tasks for skill-level upgrade.**

2.2.1. All tasks in the 3 level column are considered wartime tasks. In response to a wartime scenario, these tasks will be taught in the 3-level course in a streamlined training environment.

2.2.2. Tasks identified by a diamond (♦) in column 2 are extremely important to the career field. Equipment shortfalls at most locations however, have created problems with the actual hands-on certification of these tasks. In instances where required equipment is not available for instruction, completion of the task's AFQTP and passing the corresponding CerTest is all that is required for upgrade and qualification training.

2.3. Provides certification for OJT. Columns 3A, B, C, D, and E are used to record completion of tasks and knowledge training requirements. If available, use automated training management systems to document technician qualifications. Task certification of core and critical tasks requires a training completion date and initials of the trainee, trainer, and certifier. All non-core tasks require training completion date and initials of the trainee and trainer only.

2.4. Shows formal training and correspondence course requirements. Columns 4A, B, and C show the proficiency to be demonstrated on the job by the graduate as a result of training on the task/knowledge and the career knowledge provided by the initial skills training course, correspondence course, and read-ahead material. See CADRE/AFSC/CDC listing maintained by the unit training manager for current CDC listings.

2.5. Identifies qualitative requirements. Attachment 1 contains the *Proficiency Code Key* used to indicate the level of training and knowledge provided by resident training and career development courses

2.6. Becomes a Job Qualification Standard (JQS) for on-the-job training when placed in AF Form 623, Individual Training Record, and used according to AFI 36-2201. When used as a JQS, the following requirements apply:

2.6.1. Documentation. Document and certify completion of training.

2.6.1.1. Identify current duty position requirements by circling the subparagraph number or letter next to the task statement. **Additionally, all core and diamond (◆) tasks should be circled.** Document task completion by annotating columns 3A, 3B, 3C, and 3D. **NOTE:** All entries shall be made in pencil.

2.6.1.2. Enter the start date of the AFQTP on the documentation record. Once completed enter the completion date. When **hands-on** training is started and completed annotate the STS accordingly.

2.6.1.3. Transcribing from old document to CFETP. Use the new STS to identify and certify all current and past task qualifications.

2.6.1.3.1. For tasks previously certified and still required in the current duty position:

2.6.1.3.1.1. For core and critical tasks, the trainer and certifier evaluate the airman's current qualifications and validate airman's ability to complete the task. The certifier and trainee then enter their initials and new certified date.

2.6.1.3.1.2. For non-core duty position tasks, the trainer evaluates the airman's current qualifications and validates the airman's ability to complete the task. The trainer and trainee then enter their initials in columns 3D and 3C respectively and the current date is entered in column 3B.

2.6.1.3.2. To transcribe previous certification for tasks not required in the current duty position, carry forward only the previous completion dates (not the initials of another person). If and when these tasks become a duty position requirement, re-certify with current date and certifier, trainer, and trainee's initials.

2.6.1.4. Documenting Career Knowledge. When a CDC is not available, the supervisor identifies STS training references that the trainee requires for career knowledge and ensures, as a minimum, that trainees cover all mandatory items specified in AFMAN 36-2108, Enlisted Classification. For two-time CDC exam failures, supervisors identify all STS items corresponding to the areas covered by the CDC. The trainee completes a study of STS references, undergoes evaluation by the task certifier, and receives certification on the STS. **NOTE:** Career knowledge must be documented prior to submitting a CDC waiver.

2.6.1.5. De-Certification and Re-Certification. When an airman is found to be unqualified on a task, the supervisor shall erase previous certification and enter airman into qualification training. Appropriate remarks are entered on the AF Form 623a, On-The-Job Training Record Continuation Sheet, as to the reason for de-certification. The individual is re-certified using the normal certification process.

2.6.2. Training Standard. Tasks are trained and certified to the “go” level. “Go” means the individual can perform the task without assistance and meets the local requirements for accuracy, timeliness, and correct use of procedures. This equates to a “3c” in the proficiency code key. AFQTPs, when available, shall be used to identify Air Force standardized procedures. Local requirements for accuracy, timeliness, and use of procedures shall be applied accordingly.

2.7. The STS is used as a guide for development of promotion tests in the Weighted Airman Promotion System (WAPS). Senior NCOs with extensive practical experience in their career fields develop Specialty Knowledge Tests (SKTs) at the USAF Occupational Measurement Squadron. The tests sample knowledge of STS subject matter areas judged by test development team members as most appropriate for promotion to higher grades. Questions are based upon study references listed in the WAPS catalog. Individual responsibilities are in Chapter 14 of AFI 36-2606, United States Air Force Reenlistment, Retention, and NCO Status Programs. WAPS is not applicable to the Air National Guard or Air Reserve Forces.

3. Recommendations. Comments and recommendations are invited concerning quality of training AETC graduates receive. Reference this STS regarding changes and address your correspondence to 782 TRG/TTS, 620 9th Avenue, Suite 3, Sheppard AFB TX 76311-2368. A 782d customer service information line (CSIL) has been installed for the supervisor’s convenience to identify graduates who may have received over or under training on tasks/knowledge items listed in this STS. For a quick response to problems, call the CSIL at DSN 736-2574 any time (day or night).

BY ORDER OF THE SECRETARY OF THE AIR FORCE

OFFICIAL

EARNEST O. ROBBINS II, Maj Gen, USAF
The Civil Engineer
DCS/Installations and Logistics

4 Attachments

1. Qualitative Requirements
2. 3-, 5-, and 7-level career field training requirements
3. General Contingency Requirements
4. AFQTP Documentation record

THIS BLOCK IS FOR IDENTIFICATION PURPOSES ONLY		
NAME OF TRAINEE		
PRINTED NAME (Last, First, Middle Initial)	INITIALS (Written)	SSN
PRINTED NAME OF CERTIFYING OFFICIAL AND WRITTEN INITIALS		
N/I	N/I	
N/I	N/I	
N/I	N/I	
N/I	N/I	
N/I	N/I	
N/I	N/I	

QUALITATIVE REQUIREMENTS

PROFICIENCY CODE KEY		
	SCALE VALUE	DEFINITION: The individual
TASK PERFORMANCE LEVELS	1	Can do simple parts of the task. Needs to be told or shown how to do most of the task. (EXTREMELY LIMITED)
	2	Can do most parts of the task. Needs help only on hardest parts. (PARTIALLY PROFICIENT)
	3	Can do all parts of the task. Needs only a spot check of completed work. (COMPETENT)
	4	Can do the complete task quickly and accurately. Can tell or show others how to do the task. (HIGHLY PROFICIENT)
*TASK KNOWLEDGE LEVELS	a	Can name parts, tools, and simple facts about the task. (NOMENCLATURE)
	b	Can determine step by step procedures for doing the task. (PROCEDURES)
	c	Can identify why and when the task must be done and why each step is needed. (OPERATING PRINCIPLES)
	d	Can predict, isolate, and resolve problems about the task. (ADVANCED THEORY)
**SUBJECT KNOWLEDGE LEVELS	A	Can identify basic facts and terms about the subject. (FACTS)
	B	Can identify relationship of basic facts and state general principles about the subject. (PRINCIPLES)
	C	Can analyze facts and principles and draw conclusions about the subject. (ANALYSIS)
	D	Can evaluate conditions and make proper decisions about the subject. (EVALUATION)
EXPLANATIONS		
<p>* A task knowledge scale value may be used alone or with a task performance scale value to define a level of knowledge for a specific task. (Examples: b and 1b)</p> <p>** A subject knowledge scale value is used alone to define a level of knowledge for a subject not directly related to any specific task, or for a subject common to several tasks.</p> <p>- This mark is used alone instead of a scale value to show that no proficiency training is provided in the course or CDC.</p> <p>X This mark is used alone in course columns to show that training is required but not given due to limitations in resources.</p>		

Note 1: Underlined training references are commercial publications or other publications essential for enlisted specialty training and mission accomplishment.

Note 2: Task knowledge gained at Basic Military Training (BMT) will not be repeated during resident training.

Note 3: Prior to attending Civil Engineer Management Craftsman resident course, all personnel must successfully complete the 7-level Read-ahead Material (RAM) for J3ACR3E070 000. Personnel must present RAM test results upon arrival.

Note 4: AFQTPs are provided through multiple delivery systems (paper-based, CD-ROM, or video). Completion is required for upgrade or qualification. Access AFCEA's homepage (www.afcesa.af.mil) for most current AFQTPs.

Note 5: Annotate AFQTP completion on the AFQTP Documentation Record (Attachment 4). The AFQTP Documentation Record is used to track knowledge training only. Annotate the STS only when hands-on training is started and completed.

Note 6: In addition to completing the AFQTP Documentation Record, for ease of reference, you may place an "X" in column "4B(2)-AFQTP" to denote AFQTP completion.

1. Task Knowledge And Technical References	2. Core Tasks	3. Certification for OJT					4. Proficiency Codes Used To Indicate Training / Information Provided					
		A	B	C	D	E	A 3 Skill Level		B 5 Skill Level		C 7 Skill Level	
		Tng Start	Tng Complete	Trainee Initials	Trainer Initials	Certifier Initials	(1) Course	(2)	(1) CDC	(2) AFQTP	(1) RAM	(2) Course
1. CE ORGANIZATION AND CAREER FIELD STRUCTURE TR: AFDD 2-4.2; AFIs 10-209, 10-210, 10-211, 32-1022, 36-2101, 38-101, 51-903; AFMAN 36-2108; AFPAMs 32-1004v.1-6; 32-1005												
1.1. Base Civil Engineer (BCE) structure							A		B			
1.2. Progression in career ladder							A		B			
1.3. Duties and responsibilities												
1.3.1. Peacetime							A					
1.3.2. Contingency							A					
1.4. Functions of:												
1.4.1. BCE							A		B		B	
1.4.2. Prime BEEF							A		B		B	
1.4.3. RED HORSE							A		B		B	
1.4.4. HQ ANG/AFRC							A		B		B	
1.5. Resources												
1.5.1. Assess manpower requirements											b	3c
1.5.2. Identify budget requirements											b	3c
1.5.3. Determine equipment requirements											b	3c
1.5.4. Use Allowance Standards (AS)											b	3c
1.5.5. Research, Development, and Acquisition (RD&A) TR: DoDD 5000.1												
1.5.5.1. Process												B
1.5.5.2. Unit responsibilities												B
1.5.5.3. Major command responsibilities												B
1.5.6. Assess vehicle requirements											b	1b
1.5.7. Requesting contract services											b	2c
1.5.8. Requesting Simplified Acquisition of Base Engineering Requirements (SABER) contract											B	C
2. SPECIFIC OPSEC VULNERABILITIES TR: AFI 10-1101							A					

1. Task Knowledge And Technical References	2. Core Tasks	3. Certification for OJT					4. Proficiency Codes Used To Indicate Training / Information Provided					
		A	B	C	D	E	A 3 Skill Level		B 5 Skill Level		C 7 Skill Level	
		Tng Start	Tng Complete	Trainee Initials	Trainer Initials	Certifier Initials	(1) Course	(2)	(1) CDC	(2) AFQTP	(1) RAM	(2) Course
3. PRACTICE COMPUTER SECURITY TR: AFSSI 5102							A				A	1b
4. SUPERVISION TR: AFMAN 36-2108; AFIs 36-2201; DoDD 5500.7												
4.1. Orient new personnel											b	
4.2. Assign personnel to work crew											b	
4.3. Coordinate work assignments											b	
4.4. Schedule work assignments and priorities											b	
4.5. Establish:												
4.5.1. Work methods											b	
4.5.2. Controls											b	
4.5.3. Performance standards											b	
4.6. Evaluate work performance of subordinate personnel											b	
4.7. Resolve technical problems for subordinate personnel											b	
4.8. Direct projects											b	2b
5. TRAINING TR: AFIs 36-2101, 36-2201; AFMAN 36-2108; AFPAM 36-2247												
5.1. Evaluate personnel to determine need for training									b		b	3c
5.2. Enlisted specialty training supervision												
5.2.1. Prepare job qualification standards											b	3c
5.2.2. Conduct training											b	3c
5.2.3. Counsel trainees on their progress											b	3c
5.2.4. Monitor training effectiveness of:												
5.2.4.1. Career knowledge									a		b	3c
5.2.4.2. Job proficiency upgrade									a		b	3c
5.2.4.3. Qualification									a		b	3c
5.3. Maintain training records									a		b	3c
5.4. Evaluate training programs effectiveness											b	3c
5.5. Recommend people for training											a	b
5.6. AETC training management system (Training Allocation)									A		A	B
5.7. Managing Certification and Testing (CerTest)							A		B			B
5.8. National/DoD Certification requirements									A		A	B
5.9. AFQTP Requirements											B	

1. Task Knowledge And Technical References	2. Core Tasks	3. Certification for OJT					4. Proficiency Codes Used To Indicate Training / Information Provided					
		A	B	C	D	E	A		B		C	
		Tng Start	Tng Complete	Trainee Initials	Trainer Initials	Certifier Initials	3 Skill Level		5 Skill Level		7 Skill Level	
							(1) Course	(2)	(1) CDC	(2) AFQTP	(1) RAM	(2) Course
6. ENVIRONMENTAL AWARENESS AND COMPLIANCE TR: AFIs 32-4002, 32-7045, 32-7061; Chemicals in Your Community (EPA 550-K-93-003); EO 12856												
6.1. Environmental Compliance Assessment Management Program (ECAMP)							A		B		B	
6.2. National Environmental Policy Act (NEPA)							A		B		B	
6.3. Environmental Impact Analysis Process (EIAP)							A		B		B	
6.4. Emergency Planning and Community Right to Know Act (EPCRA)							A		B		B	
7. CE MANAGEMENT TR: AFI 32-1001, 32-1022; AFPAMs 32-1004 v1-6; 32-1005; 32-1098; AFMAN 23-110												
7.1. Customer relationships							A		B		B	
7.2. Work identification and authorization									A		B	
7.3. Plan work requirements									a		b	2b
7.4. Plan logistics support (CEMAS, BOM)									a		b	2b
7.5. IMPAC Program											A	B
7.6. Maintain recurring work program									a		b	2b
7.7. Scheduling/time accounting									a		b	2b
7.8. Warranty and Guarantee Program									A		B	
7.9. Property Accountability									B			B
7.10. Base Comprehensive Plan											A	
7.11. Legal limits									A			
7.12. Mark "As Built " Drawings											b	2b
7.13. Reimbursements procedures									A		B	
7.14. CE Specific Automated Systems (Computer) Capability												
7.14.1. Perform inputs									a		b	1a
7.14.2. Maintain files									a		b	1a
7.14.3. Develop automated reports									a		b	1a
7.14.4. Extract automated reports									a		b	1a
7.14.5. Perform automated data analysis									a		b	1a
7.15. Host Tenant and Interservice Agreements											A	
7.16. Civil Engineer Civilian Management											B	C
8. COMMUNICATIONS TR: AFI 33-106; AFJMAN 24-306												
8.1. Use radios							b					

1. Task Knowledge And Technical References	2. Core Tasks	3. Certification for OJT					4. Proficiency Codes Used To Indicate Training / Information Provided					
		A	B	C	D	E	A 3 Skill Level		B 5 Skill Level		C 7 Skill Level	
		Tng Start	Tng Complete	Trainee Initials	Trainer Initials	Certifier Initials	(1) Course	(2)	(1) CDC	(2) AFQTP	(1) RAM	(2) Course
8.2. Use hand signals							b					
8.3. Identify airdrome signals							b					
9. AF OCCUPATIONAL SAFETY AND HEALTH (AFOSH) PROGRAM TR: AFPDs 91-2, 91-3; AFI 91-302												
9.1. Supervisory responsibilities									B			
9.2. Hazardous materials waste handling TR: AFR 19-1; ALM-44-0465-WB(E) A							A		B			
9.3. Lead-based paint (LBP) hazard TR: 29- CFR 1926.62; Working With Lead-based Paint: Facts and Information Applicable to Air Force Facilities							B					
9.4. Fire extinguisher training							A					
10. PUBLICATIONS TR: AFI 33-360; AFPAMs 32-1004 v1-6; 32-1005												
10.1. Military							A		B			
10.2. Commerical							A		B			
10.3. Engineering Technical Letters (ETL)							A		B			
11. AFS CONVENTIONAL TASKS AND STANDARDS												
11.1. AFOSH Training Standards												
11.1.1. AFOSH Training/Standards/Hazards for AFS							A		B			
11.1.2. Initial Federal Hazard Communication Training Program (FHCTP) TR: DoD 6050.5-G-1; AFOSH 121-21; AFI 91-302							A					
11.1.3. Individual responsibilities							A		B			
11.1.4. Apply safety practices when working with:												
11.1.4.1. Electrical equipment							2b		b			
11.1.4.2. Mechanical equipment							2b		b			
11.1.4.3. Hazardous noise							2b		b			
11.1.4.4. Flammables							2b		b			
11.1.4.5. Chemicals/Acids							a		b			
11.1.4.6. Refrigerants							2b		b			
11.1.4.7. Steam							2b		b			
11.1.4.8. Hot water							2b		b			
11.1.4.9. Air pressure							2b		b			
11.1.4.10. Asbestos							a		b			
11.1.5. Apply first aid procedures for:												
11.1.5.1. Electrical shock							b		b			
11.1.5.2. Burns							a		b			

1. Task Knowledge And Technical References	2. Core Tasks	3. Certification for OJT					4. Proficiency Codes Used To Indicate Training / Information Provided					
		A	B	C	D	E	A 3 Skill Level		B 5 Skill Level		C 7 Skill Level	
		Tng Start	Tng Complete	Trainee Initials	Trainer Initials	Certifier Initials	(1) Course	(2)	(1) CDC	(2) AFQTP	(1) RAM	(2) Course
11.1.6. Perform cardiopulmonary resuscitation (CPR)							3c					
11.1.7. Backflow prevention to protect potable water supplies							A		B			
11.1.8. Manual lifting awareness							A		B			
11.1.9. Identification of hazardous piping TR: ANSI A13.1; MIL-STD 101B A							A		B			
11.2. AFS SPECIFIC PUBLICATIONS TR: AFI 37- 160 Vol 1; AFIND 2, 9; T.O.s 0-1-01, 0-1-02, 00-2-1, 00-5-1, 00-5-2, 00-20-7												
11.2.1. Technical Orders							A		b			
11.2.2. Instructions, Regulations, Pamphlets, and Manuals							A		b			
11.2.3. National Electric Code (NFPA 70)							A		b			
11.2.4. National Electric Safety Code							A		B			
11.2.5. ASHRAE Manuals									B			
11.2.6. ASME Codes									B			
11.2.7. Manufacturers Manuals									B			
11.2.8. Use publications to perform maintenance, operations, and troubleshooting							1a		b			
11.2.9. Use indexes to locate numbers and titles of instructions, manuals, regulations, technical orders, and forms							1a		b			
11.3. TOOLS & TEST EQUIPMENT TR: AFI 32-1064; T.O.s 32-1-101, 33A1-12-2-1												
11.3.1. Maintain and use tools (hand and powered)							2b		b			
11.3.2. Maintain and use precision measuring instruments							1a		b			
11.3.3. Maintain and use electrical test equipment							2b		b			
12. PIPING/TUBING TR: T.O.s 34W4-1-5, -7, -8												
12.1. Types & sizes							B		B			
12.2. Fittings							B		B			
12.3. Pipe insulation												
12.3.1. Install preformed insulation							2b		b			
12.3.2. Install insulating tape							2b		b			
12.4. Piping systems fabrication												
12.4.1. Fabricate piping and tubing systems	*						2b		b			
12.4.2. Install piping and tubing systems	*						2b		b			
12.5. Types and operating principles of valves							A		B			

1. Task Knowledge And Technical References	2. Core Tasks	3. Certification for OJT					4. Proficiency Codes Used To Indicate Training / Information Provided					
		A	B	C	D	E	A 3 Skill Level		B 5 Skill Level		C 7 Skill Level	
		Tng Start	Tng Complete	Trainee Initials	Trainer Initials	Certifier Initials	(1) Course	(2)	(1) CDC	(2) AFQTP	(1) RAM	(2) Course
12.6. Interpret system drawings							1a		b			
12.7. Perform recurring maintenance									a			
13. WELDING & CUTTING TR: T.O.s 32-1-101, 32-1-151, 34W4-1-7, 42D-1-3, 34W4-1-8; AFOSH 127-5												
13.1. Theory of operation												
13.1.1. Acetylene equipment (air and hydrocarbon)							B		B			
13.1.2. Oxyacetylene equipment							B		B			
13.2. Use equipment												
13.2.1. Cut							2b		b			
13.2.2. Braze and solder	*						2b		b			
13.3. Maintain equipment							2b		b			
14. HVAC/R PHYSICS TR: Principles of Refrigeration; Environmental Systems Technology												
14.1. Structure of matter							A					
14.2. Energy (Stored, Nonstored, Conversion)							A		B			
14.3. Laws of thermodynamics							A		B			
14.4. Heat flow (Energy, Measurement, Transfer)							A		B			
14.5. Fluid flow (Properties, Static's, Dynamics)							A		B			
14.6. Psychrometrics												
14.6.1. Properties of air							A		B			
14.6.2. Air-vapor relationship							A		B			
14.6.3. Psychrometric Chart												
14.6.3.1. Terms							A		B			
14.6.3.2. Plotting conditions									b			
14.6.4. Psychrometric processes												
14.6.4.1. Plot processes									b			
14.6.4.2. Interpretation									b			
14.7. Metric conversion							a		b			
15. AIR and HYDRONIC SYSTEMS TR: Modern Refrigeration & Air Conditioning; Trane Air Conditioning Manual; Principles of Refrigeration; ASHRAE Handbooks; Environmental Systems Technology; Testing and Balancing HVAC System Manual												
15.1. Air Systems												
15.1.1. Operating principles of fans (types, ratings, motors, and drives)							A		B			

1. Task Knowledge And Technical References	2. Core Tasks	3. Certification for OJT					4. Proficiency Codes Used To Indicate Training / Information Provided					
		A	B	C	D	E	A		B		C	
		Tng Start	Tng Complete	Trainee Initials	Trainer Initials	Certifier Initials	3 Skill Level		5 Skill Level		7 Skill Level	
							(1) Course	(2)	(1) CDC	(2) AFQTP	(1) RAM	(2) Course
15.1.2. Operating principles of air distribution systems												
15.1.3. Duct airflow characteristics							A		B			
15.1.4. Single path							A		B			
15.1.5. Multi-zone							A					
15.1.6. Dual path							A		B			
15.1.7. Fan and system curve relationships									B			
15.1.8. Perform psychrometric analysis									b			
15.1.9. Constant Air Volume (CAV)							A		B			
15.1.10. Variable Air Volume (VAV)							A		B			
15.1.11. Dampers												
15.1.11.1. Adjust dampers							b		b			
15.1.11.2. Adjust mechanical linkages							2b		b			
15.1.12. General procedures for air balancing							a		b			
15.1.13. Air volume measurement (methods, interpretation)							a		b			
15.1.14. Indoor air quality							A		B			
15.1.15. Interpret system drawings							2b		c			
15.2. Hydronic Systems												
15.2.1. Operating principles of hydronic distribution systems (Types)							A		B			
15.2.2. Operation principles of pumps (types and construction features)												
15.2.2.1. Install circulating pumps							1a		b			
15.2.2.2. Adjust centrifugal water pump flow							a		b			
15.2.2.3. Adjust packing on water pumps							a		b			
15.2.2.4. Replace mechanical seals							2b		b			
15.2.2.5. Pump and system curve relationships							A		B			
15.2.3. Hydronic system flow												
15.2.3.1. Hydronic system analysis							A		B			
15.2.3.2. Hydronic volume measurement (methods, interpretation)							a		b			
15.2.3.3. Perform general procedures for hydronic balancing							a		b			
15.2.3.4. Adjust hydronic system flow							a		b			
15.2.4. Interpret system drawings							2b		c			
15.3. Associated Components and Equipment												
15.3.1. Coils (Types & Applications)												
15.3.1.1. Cooling							A		B			
15.3.1.2. Heating							A		B			
15.3.1.3. Preheat							A		B			
15.3.1.4. Reheat							A		B			
15.3.2. Fancoil units							A		B			
15.3.3. Adjust dehumidification equipment							a		b			

1. Task Knowledge And Technical References	2. Core Tasks	3. Certification for OJT					4. Proficiency Codes Used To Indicate Training / Information Provided					
		A	B	C	D	E	A 3 Skill Level		B 5 Skill Level		C 7 Skill Level	
		Tng Start	Tng Complete	Trainee Initials	Trainer Initials	Certifier Initials	(1) Course	(2)	(1) CDC	(2) AFQTP	(1) RAM	(2) Course
15.3.4. Adjust humidification equipment							a		b			
15.3.5. Filters (Types)							A		B			
15.4. Perform Recurring Maintenance												
15.4.1. Determine drive belt types & sizes							a					
15.4.2. Inspect and replace drive belts							a		b			
15.4.3. Adjust drive belt tension							a		b			
15.4.4. Adjust pulleys							a		b			
15.4.5. Clean strainers							a		b			
15.4.6. Clean air filters							a		b			
15.4.7. Inspect water valves for leaks							a		b			
15.4.8. Inspect fan coil units							a		b			
15.4.9. Clean air handlers							a		b			
15.4.10. Clean coils							a		b			
16. ELECTRICAL TR: AFI 32-1064; T.O. 31-1-141 series; National Electrical Code; ANSI Y32.2												
16.1. Fundamentals of electricity							B		B			
16.2. Types of circuits							B		B			
16.3. Relationship of current, voltage, and resistance in circuits (AC and DC)							B		B			
16.4. National Electrical Code wiring requirements							B		C			
16.5. Interpret electrical drawings and symbols							2b		c			
16.6. Types and operating principles of safety devices							B		C			
16.7. Types and operating principles of transformers							B		B			
16.8. Types of operating principles of electromagnetic devices (relays, contactors, and across-the-line starters)							B		B			
16.9. Motors												
16.9.1. Types & operating principles (single-phase and three phase)							B		B			
16.9.2. Replace motors							3c					
16.9.3. Perform operational test							3c		b			
16.9.4. Align							2b		b			
16.9.5. Electrically connect (single-phase and three phase)	*						3c		b			
16.9.6. Reverse rotation of electric motors	*						3c		b			
16.9.7. Measure motor current draw	*						3c		b			
16.9.8. Service electrical motors							b		b			
16.10. Types and operating principles of motor controllers and variable frequency drives							B		C			
16.11. Repair Components												

1. Task Knowledge And Technical References	2. Core Tasks	3. Certification for OJT					4. Proficiency Codes Used To Indicate Training / Information Provided					
		A	B	C	D	E	A 3 Skill Level		B 5 Skill Level		C 7 Skill Level	
		Tng Start	Tng Complete	Trainee Initials	Trainer Initials	Certifier Initials	(1) Course	(2)	(1) CDC	(2) AFQTP	(1) RAM	(2) Course
16.11.1. Troubleshoot electrical circuits and components							2c		b			
16.11.2. Correct malfunctions							2c		b			
16.12. Solder electrical connections							2b		b			
17. HVAC CONTROL SYSTEMS TR: AFJMAN 32-1093; <u>Modern</u> <u>Refrigeration & Air Conditioning;</u> <u>Principles of Refrigeration Control</u> <u>Systems for HVAC; Automatic Controls for</u> <u>Heating and Air Conditioning;</u> <u>Environmental Systems Technology</u>												
17.1. Types												
17.1.1. Pneumatic							B		C			
17.1.2. Electrical							B		C			
17.1.3. Electronic							B		C			
17.1.4. Direct Digital Control							B		B			
17.2. Components							B		C			
17.3. Operating principles							B		C			
17.4. Perform recurring maintenance							1a		b			
17.5. Repair Components												
17.5.1. Troubleshoot							2c		b			
17.5.2. Correct malfunctions							2c		b			
17.6. Calibrate and adjust							2b		b			
17.7. Subsystem control strategies							A		B			
17.8. System control strategies							A		B			
17.9. Perform system changes									b			
17.10. Energy monitoring & control systems (EMCS operating principles and components)							A		B			
18. FUELS & FUEL SYSTEMS TR: AFI32-1068; ASHRAE Handbook, 1989 Fundamentals												
18.1. Characteristics of fuels (oil, gas)							A		B			
18.2. Types and operating principles of fuel systems							A		B			
18.3. Environmental concerns							A		B			
18.4. Inspect systems for leaks							2b		b			
19. BURNERS TR: ASHRAE Handbook, 1988 Equipment												
19.1. Construction features and operating principles of burners (oil and gas)							A		B			
19.2. Properties of combustion							A		B			

1. Task Knowledge And Technical References	2. Core Tasks	3. Certification for OJT					4. Proficiency Codes Used To Indicate Training / Information Provided					
		A	B	C	D	E	A 3 Skill Level		B 5 Skill Level		C 7 Skill Level	
		Tng Start	Tng Complete	Trainee Initials	Trainer Initials	Certifier Initials	(1) Course	(2)	(1) CDC	(2) AFQTP	(1) RAM	(2) Course
19.3. Operating principles of analyzers							A		B			
19.4. Perform pre-operational inspections							2b		b			
19.5. Perform operational test							2b		b			
19.6. Perform combustion analysis							2b		b			
19.7. Compute combustion efficiency							2b		b			
19.8. Adjust fuel/air ratio for proper combustion efficiency	*						2b		b			
19.9. Perform recurring maintenance							2b		b			
19.10. Repair components												
19.10.1. Troubleshoot							2b		b			
19.10.2. Correct malfunctions							2b		b			
19.11. Environmental concerns							A		B			
20. STEAM AND HOT WATER SYSTEMS TR: AFI 32-1068; ASHRAE Handbook, Equipment; Applications; ASME Boiler Pressure Vessel Code; Steam, It's Generation and Use												
20.1. Properties of steam							A		B			
20.2. Operating principles of steam distribution systems (types and components)							B		B			
20.3. Steam system analysis									B			
20.4. Types of operating principles (firetubes, watertubes, and cast iron)							B		B			
20.5. Construction features (waterside, fireside, and external fittings)							B		B			
20.6. Auxiliary equipment (feedwater system, safety devices, and controls)							B		B			
20.7. Perform pre-operational inspection							1a		b			
20.8. Perform operational test							1a		b			
20.9. Perform recurring maintenance							1a		b			
20.10. Repair boilers and/or auxiliary equipment												
20.10.1. Troubleshoot							2c		b			
20.10.2. Correct malfunctions							2c		b			
20.11. Prepare boiler for inspection (Types A, B, C, D)							a		B			
21. AIR CONDITIONING & REFRIGERATION SYSTEMS TR: <u>Modern Refrigeration & Air</u> <u>Conditioning; Air Conditioning; Trane Air</u> <u>Conditioning Manual; Copeland</u> <u>Refrigeration Manuals</u>												
21.1. Refrigerants (types and uses)							C		C			
21.2. Oils (types and uses)							C		C			

1. Task Knowledge And Technical References	2. Core Tasks	3. Certification for OJT					4. Proficiency Codes Used To Indicate Training / Information Provided					
		A	B	C	D	E	A		B		C	
		Tng Start	Tng Complete	Trainee Initials	Trainer Initials	Certifier Initials	3 Skill Level		5 Skill Level		7 Skill Level	
							(1) Course	(2)	(1) CDC	(2) AFQTP	(1) RAM	(2) Course
21.3. Process refrigerants IAW EPA and Air Force Standards												
21.3.1. Locate refrigerant leaks	*						2b		b			
21.3.2. Universal Certification							C					
21.3.3. Recover and recycle refrigerants from refrigeration and air conditioning systems	*						2b		b			
21.3.4. Pump down refrigeration systems	*						2b		b			
21.3.5. Pressure check refrigeration systems	*						2b		b			
21.3.6. Charge HVAC/R systems with refrigerant	*						2b		b			
21.3.7. Retrofit with alternative refrigerants							A		B			
21.4. Basic refrigeration cycle							B		C			
21.5. Operating principles & construction features												
21.5.1. Components												
21.5.1.1. Compressors (reciprocating, centrifugal, rotary, screw, scroll)							A		B			
21.5.1.2. Evaporators (direct and indirect expansion)							A		B			
21.5.1.3. Condensers (air and water cooled)							A		B			
21.5.1.4. Cooling towers							A		B			
21.5.1.5. Metering devices/flow controls expansion valves, capillary tubes/orifices, and pressure regulators							A		B			
21.5.1.6. Refrigeration accessories							A		B			
21.5.1.7. Capacity control (compressor, condenser, and system)							A		B			
21.5.2. Refrigerator/freezer systems												
21.5.2.1. Commercial							B		B			
21.5.2.2. Ice machines							B		B			
21.5.2.3. Cold storage (permanent/portable)							B		B			
21.5.3. Air conditioning systems												
21.5.3.1. Package units							B		B			
21.5.3.2. Split systems							B		B			
21.5.3.3. Heat pumps/resistive units							B		B			
21.5.3.4. Industrial systems												
21.5.3.4.1. Reciprocating							B		B			
21.5.3.4.2. Centrifugal							B		B			
21.5.3.4.3. Screws							B		B			
21.5.3.4.4. Scroll							B		B			
21.5.3.5. Equipment cooling							B		B			
21.5.3.6. Multiple component system compressors and evaporators							A		B			
21.5.3.7. Plot pressure enthalpy chart for refrigeration cycle	**								b			

1. Task Knowledge And Technical References	2. Core Tasks	3. Certification for OJT					4. Proficiency Codes Used To Indicate Training / Information Provided					
		A	B	C	D	E	A 3 Skill Level		B 5 Skill Level		C 7 Skill Level	
		Tng Start	Tng Complete	Trainee Initials	Trainer Initials	Certifier Initials	(1) Course	(2)	(1) CDC	(2) AFQTP	(1) RAM	(2) Course
21.5.3.8. Measure air conditioning and refrigeration system efficiency using pressure-temperature charts	*						2b		b			
21.5.3.9. Calculate and adjust superheat	**						A		b			
21.5.3.10. Calculate subcooling	**						A		b			
21.5.3.11. Perform pre-operational inspection							2b		b			
21.5.3.12. Perform recurring maintenance							a		b			
21.5.3.13. Repair												
21.5.3.13.1. Troubleshoot							2c		b			
21.5.3.13.2. Correct malfunctions							2c		b			
22. AIR COMPRESSING EQUIPMENT (non-aircraft generation equipment) TR: <u>Trane Air Conditioning Manual</u>												
22.1. Types of systems (breathing and industrial)							A		B			
22.2. Construction features and operating principles of air compressors and accessories (reciprocating, screw, and oil-less)							A		B			
22.3. Perform pre-operational inspection							2c		b			
22.4. Perform operational test							2c		b			
22.5. Perform recurring maintenance												
22.6. Repair												
22.6.1. Troubleshoot							2c		b			
22.6.2. Correct malfunctions							2c		b			
23. WARM AIR HEATING TR: <u>ASHRAE Handbook, 1988 Equipment and 1988 HVAC Systems and Applications</u>												
23.1. Types and operating principles of furnaces							A		B			
23.2. Perform pre-operational inspection							1a		b			
23.3. Perform operational test							1a		b			
23.4. Perform recurring maintenance							a		b			
23.5. Repair												
23.5.1. Troubleshoot							2c		b			
23.5.2. Correct malfunctions							2c		b			
24. RADIANT HEATING TR: <u>ASHRAE Handbooks, 1988 Equipment, 1987 HVAC Systems and Applications</u>												
24.1 Types and operating principles							A		B			
24.2. Perform pre-operational inspection							1a		b			
24.3. Perform operational test							1a		b			

1. Task Knowledge And Technical References	2. Core Tasks	3. Certification for OJT					4. Proficiency Codes Used To Indicate Training / Information Provided					
		A	B	C	D	E	A		B		C	
		Tng Start	Tng Complete	Trainee Initials	Trainer Initials	Certifier Initials	3 Skill Level		5 Skill Level		7 Skill Level	
							(1) Course	(2)	(1) CDC	(2) AFQTP	(1) RAM	(2) Course
24.4. Perform recurring maintenance							a		b			
24.5. Repair												
24.5.1. Troubleshoot							1a		b			
24.5.2. Correct malfunctions							1a		b			
25. WATER TESTING & TREATMENT FOR HEATING AND COOLING EQUIPMENT TR: AFI32-1054; <u>Betz Handbook of Water Conditioning</u>												
25.1. Water characteristics							A		B			
25.2. Purpose and types of tests							A		B			
25.3. Internal treatment methods												
25.3.1. Adjust water levels												
25.3.1.1. Add water to systems									b			
25.3.1.2. Drain water from systems									b			
25.3.2. Adjust antifreeze levels												
25.3.2.1 Add antifreeze to systems							a		b			
25.3.2.2. Drain antifreeze from systems							a		b			
25.4. External treatment methods									B			
25.5. Chemical feeding equipment							A		B			
25.6. Environmental concerns							A		B			
26. EXTERNAL CORROSION TR: AFIs 32-1054, 32-1068												
26.1. Causes and types							A		B			
26.2. Methods of Controlling							A		B			
26.3. Environmental Concerns							A		B			
27. AFSC SPECIFIC CONTINGENCY RESPONSIBILITIES TR: AFIs 10-210; 10- 211, 32-1026; T.O.s 35E-5-6-1, 35E4-132-1, 35E4-94-1; Army TMs 10-8340-207-14, 10-450-200-12; WMP-1, Annex S; (Mar 95); AFPAM 10-219, Vol 1, 2, 3, 4, & 5												
27.1. Expedient repair and destruction												
27.1.1. Facility Repair TR: AFPAM 10-219, Vol 3; Home Station Training Category (HST) 1 & 2												
27.1.1.1. Theory of heating/air conditioning systems expedient repair and cannibalization techniques							A		B			
27.1.1.2. Fabrication procedures for temporary heating/air conditioning duct							a		B			
27.1.1.3. Techniques for temporary installation of mobile/portable heating units							A		B			

1. Task Knowledge And Technical References	2. Core Tasks	3. Certification for OJT					4. Proficiency Codes Used To Indicate Training / Information Provided					
		A	B	C	D	E	A		B		C	
		Tng Start	Tng Complete	Trainee Initials	Trainer Initials	Certifier Initials	3 Skill Level		5 Skill Level		7 Skill Level	
							(1) Course	(2)	(1) CDC	(2) AFQTP	(1) RAM	(2) Course
27.1.2. Debris Removal TR: AFI 10-211; AFPAM 10-219, Vol 4; TO 36C12 series									A			
27.2. Expedient Beddown Methods TR: AFPAM 10-219, Vol 2 & 5												
27.2.1. Harvest Eagle (HE) type assets												
27.2.1.1. HE water distribution systems TR: T.O.s 00-105K-1, 36A11-20-4-3, 37A12-1-121; TM 5-4320-228-13&P; AFPAM 10-219, Vol 5												
27.2.1.1.1. Operating principles							A		B			
27.2.1.1.2. Troubleshooting							A		B			
27.2.1.1.3. Repairs							A		B			
27.2.1.2. Immersion Heater TR: TMs 5-4540-202-12&P, 10-4500-200-13; AFPAM 10-219, Vol 5												
27.2.1.2.1. Operating principles									C			
27.2.1.2.2. Perform operational tests									b			
27.2.1.2.3. Troubleshooting									b			
27.2.1.2.4. Repairs									b			
27.2.1.3. Tent Heaters Preway and M 1941, Types 1 & 2 TR: TMs 10-4520-200-13, 5-4500-235-13; AFPAM 10-219, Vol 5												
27.2.1.3.1. Operating principles							B		C			
27.2.1.3.2. Set-up							b		b			
27.2.1.3.3. Perform operational tests	*						2b		b			
27.2.1.3.4. Service/periodic maintenance							2b		b			
27.2.1.3.5. Troubleshooting							2b		b			
27.2.1.3.6. Repairs							2b		b			
27.2.2. Harvest Falcon (HF) type assets TR: AFI 25-101; AFPAM 10-219, Vol 2, 3 & 5												
27.2.2.1. Portable shower unit (M1950 & PBU100) TR: T.O.s 40P1-2-2-1, 40P-1-6-2-1; TMs 10-4510-201-14; 10-4510-201-24P; 10-4510-206-14; 10-4510-206-24P; AFPAM 10-219, Vol 5												
27.2.2.1.1. Setup							b		B			
27.2.2.1.2. Operational principles							B		C			
27.2.2.1.3. Perform Operational tests							1a		b			
27.2.2.1.4. Service/periodic maintenance							1a		b			
27.2.2.1.5. Troubleshooting							1a		b			
27.2.2.1.6. Repairs							1a		b			
27.2.2.2. 150 Cubic Foot Refrigeration Unit TR: TMs 5-4110-239-14, 5-4110-239-24P												
27.2.2.2.1. Setup							b		b			
27.2.2.2.2. Conduct Pre-operational test	◆						2b		b			

1. Task Knowledge And Technical References	2. Core Tasks	3. Certification for OJT					4. Proficiency Codes Used To Indicate Training / Information Provided					
		A	B	C	D	E	A		B		C	
		Tng Start	Tng Complete	Trainee Initials	Trainer Initials	Certifier Initials	3 Skill Level		5 Skill Level		7 Skill Level	
							(1) Course	(2)	(1) CDC	(2) AFQTP	(1) RAM	(2) Course
27.2.2.2.3. Service/periodic maintenance	◆						2b		b			
27.2.2.2.4. Troubleshoot												
27.2.2.2.4.1. Using electrical schematic	◆						2b					
27.2.2.2.4.2. Mechanical malfunctions	◆						2b		b			
27.2.2.2.5. Repairs							2b		b			
27.2.2.3. 1200 Cubic Foot Refrigeration Unit												
27.2.2.3.1. Setup							A					
27.2.2.3.2. Conduct Pre-operational test							A					
27.2.2.3.3. Service/Periodic maintenance							A					
27.2.2.3.4. Troubleshoot												
27.2.2.3.4.1. Using electrical schematic							A					
27.2.2.3.4.2. Mechanical malfunctions							A					
27.2.2.3.5. Repairs							A					
27.2.2.4. Bare Base Air Conditioner (A/E 32C-39) TR: T.O. 35E9-163-1; AFPAM 10-219, Vol 5												
27.2.2.4.1. Set-up							b		b			
27.2.2.4.2. Perform operational tests	◆						2b		b			
27.2.2.4.3. Service/periodic maintenance	◆						2b		b			
27.2.2.4.4. Troubleshoot												
27.2.2.4.4.1. Using electrical schematic	◆						2b		b			
27.2.2.4.4.2. Mechanical malfunctions	◆						2b		b			
27.2.2.4.5. Repairs							2b		b			
27.2.2.5. Field Deployable Environmental Control Unit (FDECU) TR: T.O. 35E9-314-1												
27.2.2.5.1. Set-up							2b		b			
27.2.2.5.2. Perform operational tests	◆						2b		b			
27.2.2.5.3. Service/periodic maintenance	◆						2b		b			
27.2.2.5.4. Troubleshoot												
27.2.2.5.4.1. Using electrical schematic	◆						2b		b			
27.2.2.5.4.2. Mechanical malfunctions	◆						2b		b			
27.2.2.5.5. Repairs							2b		b			
27.2.2.6. Bare Base M149 Trailer Mounted Water Chiller TR: TMs 10-4130-239-14, 9-2330-267-14P												
27.2.2.6.1. Set-up							a		b			
27.2.2.6.2. Operate							a		b			
27.2.2.6.3. Troubleshooting							a		b			
27.2.2.6.4. Repairs							a		b			
27.2.2.7. TEMPER tent erection TR: T.O. 35E5-6-1; AFPAM 10-219, Vol 5; AFH 10-222, Vol 1												
27.2.2.7.1. Assembly							a		b			
27.2.2.7.2. Disassembly							a		b			
27.3. Miscellaneous Support												

1. Task Knowledge And Technical References	2. Core Tasks	3. Certification for OJT					4. Proficiency Codes Used To Indicate Training / Information Provided					
		A	B	C	D	E	A 3 Skill Level		B 5 Skill Level		C 7 Skill Level	
		Tng Start	Tng Complete	Trainee Initials	Trainer Initials	Certifier Initials	(1) Course	(2)	(1) CDC	(2) AFQTP	(1) RAM	(2) Course
27.3.1. Lightweight Decontamination Unit TR: T.O.'s 11D-1-3-8-1, 11C15-1-3; AFPAM 10-219, Vol 3												
27.3.1.1. Setup							2b		b			
27.3.1.2. Perform operational test							2b		b			
27.3.1.3. Service/periodic maintenance							2b		b			
27.3.1.4. Troubleshoot							2b		b			
27.3.1.5. Repairs							2b		b			
27.3.2. Field Boiler (M-80) TR: TMs 10-4510-206-14, 10-4510-206-24P; T.O.'s 40P1-6-2-1, 40P1-2-2-1, 40P1-6-21, 40P1-6-24, 35E7-4-27-1												
27.3.2.1. Operational principles							B		C			
27.3.2.2. Set-up							2b		b			
27.3.2.3. Perform operational tests	◆						2b		b			
27.3.2.4. Service/periodic maintenance	◆						2b		b			
27.3.2.5. Troubleshoot												
27.3.2.5.1. Using electrical schematic	◆						2b		b			
27.3.2.5.2. Mechanical malfunctions	◆						2b		b			
27.3.2.6. Repairs							2b		b			
27.3.3. International Electrical Systems TR: AFIs 32-106, 63-101, 32-1065; AFPD 63-1; T.O.s 00-105A, 35C2-3, 35E6 Series												
27.3.3.1. Electrical terms and symbols												
27.3.3.1.1. Metric							A		B			
27.3.3.1.2. Convert frequency							A		B			
27.3.3.1.3. Convert voltage							A		B			
27.3.3.1.4. Distribution system							A		B			
27.3.3.2. Interior Distribution system												
27.3.3.2.1. Voltage							A		B			
27.3.3.2.2. Wiring color code							A		B			
27.3.3.2.3. Wire Sizes							A		B			
27.3.3.3. Distribution Panels							A		B			
27.3.3.4. Protective devices												
27.3.3.4.1. Circuit Breakers							A		B			
27.3.3.4.2. Fuses							A		B			
27.3.3.4.3. Ground Fault Current Interrupters (GFCI)							A		B			
27.3.3.5. Devices												
27.3.3.5.1. Switches							A		B			
27.3.3.5.2. Receptacles							A		B			
27.3.3.5.3. Timers/Relays							A		B			

1. Task Knowledge And Technical References	2. Core Tasks	3. Certification for OJT					4. Proficiency Codes Used To Indicate Training / Information Provided					
		A	B	C	D	E	A 3 Skill Level		B 5 Skill Level		C 7 Skill Level	
		Tng Start	Tng Complete	Trainee Initials	Trainer Initials	Certifier Initials	(1) Course	(2)	(1) CDC	(2) AFQTP	(1) RAM	(2) Course
27.3.4. Maintain Survivable Collective Protective System (SCPS) HVAC Systems TR: T.O. 11D3-3-3-1; AFPAM 10-219, Vol 2; AFIND 11/ HST-RTP D7; DPTP D7												
27.3.5. Special purpose vehicles/equipment TR: AFPD 25-1; AFIs 23-101, 10-210; T.O.'s 36A2 series, 36M2 series, 36A12 series; AFMANs 24-306; 24-309; AFOSH 91-46; AFPAM 10-219, Vol 4; TA 12												
27.3.5.1. General purpose vehicles (up to 14,000 GVW)												
27.3.5.2. Dump truck												
27.3.5.3. Front-end loader w/forklift attachment												
27.3.6. Tactical Environment Control Units TR: T.O.s 35E9 Series												
27.3.7. Chemically Hardened Air Management Plant (CHAMP)												
27.3.8. High Mobility Multipurpose Wheeled Vehicle (HMMWV)												
27.3.9. Small Shelter System (SSS) TR: T.O. 35E5-6-11												
27.3.9.1. Environmental Control Unit (ECU) HAC-36-V4B TR: T.O. 35E9-163-11							A					
27.3.10. Know about Generators 30/60 kW TR: AFPAM 10-219, Vol 5: AFIs 32-1063, 32-1062: AFDD 42												
27.3.10.1. Setup												
27.3.10.2. Operate												
27.3.10.3. Perform Operator Maintenance												

GENERAL CONTINGENCY

1. Tasks, Knowledge, And Technical References	2. Core Tasks	3. Certification for OJT					4. Proficiency Codes Used To Indicate Training / Information Provided					
		A	B	C	D	E	A 3 Skill Level		B 5 Skill Level		C 7 Skill Level	
		Tng Start	Tng Complete	Trainee Initials	Trainer Initials	Certifier Initials	(1) Course	(2)	(1) CDC	(2) SC/QTP	(1) CDC	(2) Course
28. GENERAL CONTINGENCY RESPONSIBILITIES TR: AFIs 10-201;10-207; 10-210, 10-211, 32-1026; 32-7062; AFH 32-4011, Vol 1; T.O.s 35E-5-6-1, 35E4-132-1, 35E4-94-1; War Mobilization Plan (WMP)-1, Annex S; AFPAM 10-219, Vol 1- 10												
28.1. Prime BEEF (PB) Orientation TR: AFDD 42; AFIs 10-403; 51-401; AFD 51-4; AFCESA/CEX - Prime BEEF Equipment Supply List (ESL)												
28.1.1. The Prime BEEF (PB) Program												
28.1.2. The Prime BEEF organization												
28.1.3. Code of Conduct												
28.1.4. The Law of Armed Conflict												
28.1.5. The Prime BEEF equipment requirements												
28.1.5.1. Consolidated tool kits (CTK)												
28.1.5.2. Equipment Issues												
28.1.5.3. Equipment Storage												
28.1.5.4. Mobility bags												
28.1.5.5. Weapons TR: AFIs 10-210, 31-101, 31-207; 36-2226, 91-202; AFPAM 10-219, Vol 8												
28.1.5.5.1. Issue												
28.1.5.5.2. Control												
28.1.5.5.3. Courier												
28.1.5.6. Team kits												
28.1.5.7. Body armor												
28.1.5.8. Tactical communication system												
28.1.6. Individual responsibilities												
28.1.7. Accountability												
28.1.8. Marshal Equipment and Personal												
28.2. First Aid Techniques TR: AFIs 36-2238, 32-4001, 48-110; AFH 36-2218, Vol 2												
28.2.1. Individual's responsibilities for administering first aid												
28.2.2. Self aid and buddy care concept												

GENERAL CONTINGENCY

1. Tasks, Knowledge, And Technical References	2. Core Tasks	3. Certification for OJT					4. Proficiency Codes Used To Indicate Training / Information Provided					
		A	B	C	D	E	A 3 Skill Level		B 5 Skill Level		C 7 Skill Level	
		Tng Start	Tng Complete	Trainee Initials	Trainer Initials	Certifier Initials	(1) Course	(2)	(1) CDC	(2) SC/QTP	(1) CDC	(2) Course
28.2.3. Basic lifesaving steps												
28.2.4. Move and transport injured personnel												
28.3. Field Sanitation & Hygiene Measures TR: AFIs 48-110, 10-210; AFDD 35; ARMY FM 21-10												
28.3.1. Personal hygiene measures												
28.3.2. Countermeasures												
28.3.2.1. Disease and pestilence												
28.3.2.2. Communicable diseases												
28.3.3. Sanitation requirements												
28.3.3.1. Field												
28.3.3.2. Kitchen & Mess												
28.4. Self Protection from Extreme Weather TR: A77; AFPAM 10-219, Vol 5; Army FM 21-76												
28.4.1. Hot weather survival techniques												
28.4.2. Cold weather survival methods												
28.5. Force Protection TR: Joint Pub 1-02; AFH 32-4014, Vol 4; AFH 10-222, Vol 3; AFPAM 10-219 Vol 2; DoD 0-2000.12-H; Joint Services Guide 5260												
28.5.1. Personal / Work Party Security TR: AFIs 36-2226, 36-2209, A88, 31-301, 10-403, 10-404, 31-207, 10-215; AFPAM 10-219, Vol 3 ; Army FMs 21-75; 7-8												
28.5.1.1. Combat skills												
28.5.1.2. Defensive tactics												
28.5.1.2.1. Cover and concealment												
28.5.1.2.2. Individual movement												
28.5.1.2.3. Weapons fire control												
28.5.1.2.4. Communications												
28.5.1.2.5. Field fortifications												
28.5.1.2.6. Guard placement/perimeter defense												

GENERAL CONTINGENCY

1. Tasks, Knowledge, And Technical References	2. Core Tasks	3. Certification for OJT					4. Proficiency Codes Used To Indicate Training / Information Provided					
		A	B	C	D	E	A 3 Skill Level		B 5 Skill Level		C 7 Skill Level	
		Tng Start	Tng Complete	Trainee Initials	Trainer Initials	Certifier Initials	(1) Course	(2)	(1) CDC	(2) SC/QTP	(1) CDC	(2) Course
28.5.1.2.7. Recognition code system												
28.5.2. Air Base Defense (ABD) Interface TR: AFIs 31-301, 31-702												
28.5.2.1. Ground threats												
28.5.2.2. ABD concept												
28.5.2.3. Defensive tactics												
28.5.2.4. Force movement												
28.5.2.5. Weapons and fire control												
28.5.2.6. Tactical barriers												
28.5.2.7. Fighting/Protective Positions												
28.5.3. Convoy Techniques TR: AFIs 36-2209, 31-301, 10-211, 36-2225, 31-101; AFPAM 10-219, Vol 3; Army FMs 7-8, 7-10, 55-30												
28.5.3.1. Convoy principles												
28.5.3.1.1. Organization												
28.5.3.1.2. Command and control												
28.5.3.1.3. Vehicle preparation												
28.5.3.1.4. Security Forces interface												
28.5.3.1.5. Counter ambush techniques												
28.5.3.1.6. Defensive ambush measures												
28.5.4. Passive Defense Techniques TR: AFPAM 10-219, Vol 2 & 5; AFIs 10-210, 10-11, 10-212, 32-4001, 31-101, 31-210, 10-401 Vol 1 & 2, 31-301; TM 5-1080-200-13/P; AFH 31-302; AFMAN 32-4005; AFPDs 31-1, 71-1; AFMD 39; AFDD 2-4.2												
28.5.4.1. Hardening/splinter protection												
28.5.4.2. Aircraft revetment TR: AFPAM 10-219, Vol 2; AFMAN 10-401 Vol 1 & 2; 32-1071 Vols 1-3; AFDD 2-4.2; AFM 32-4005; AFIs 31-101, 31-210, 31-301												
28.5.4.2.1. Assemble kit-type revetments												
28.5.4.2.2. Impoverished revetments												
28.5.4.3. Resource dispersal												
28.5.4.4. Camouflage, Concealment, and Deception (CCD) Techniques TR: AFPAM 10-219, Vol 2 & 3												

GENERAL CONTINGENCY

1. Tasks, Knowledge, And Technical References	2. Core Tasks	3. Certification for OJT					4. Proficiency Codes Used To Indicate Training / Information Provided					
		A	B	C	D	E	A 3 Skill Level		B 5 Skill Level		C 7 Skill Level	
		Tng Start	Tng Complete	Trainee Initials	Trainer Initials	Certifier Initials	(1) Course	(2)	(1) CDC	(2) SC/QTP	(1) CDC	(2) Course
28.5.4.5. Terrorism TR: AFI 31-210, AFPAM 10-219, Vol 2; Joint Pub 1-02												
28.5.4.5.1. Awareness												
28.5.4.5.2. Countermeasures												
28.5.4.6. Chemical warfare protection TR: AFMAN 32-4005; AFIs 10-210, 13-218, 21-101, 32-4001; AFPAM 10-219 Vol 3 & 4; AFH 32-4014 Vol 2; AFMAN 32-4005, AFVA 32-4012												
28.5.4.6.1. Individual protective equipment												
28.5.4.6.2. Wartime threat / protective actions / procedures												
28.5.4.6.3. Decontaminating vehicle / equipment												
28.5.4.6.4. Decontaminate shelter entry point												
28.5.4.6.5. USAF standard alarm signals TR: AFPAM 10-219 Vol 2; AFVA 32-4011												
28.5.4.6.6. Protective shelters												
28.6. Base Denial TR: AFIs 10-210, 10-211; AFPAM 10-219, Vol 3; Army FM 5-250; TO 11A-1-66; WMP-1, Annex S												
28.6.1. Base denial concept												
28.6.2. Denial methods												
28.7. Multi-Contingency/Warskills Training Requirements TR: AFI 10-210; WMP-1, Annex S												
28.7.1. Multi-warskilling concept												
28.7.2. Vehicle Qualifications TR: AFI 10-210; AFPAM 10-219, Vol. 3, 4, 8; AFD 25-1; AFMAN 24-309; AFI 23-101; 25-101; AS 12; T.O.s 36A2 series, 36M2 series, 36A12 series; War & Mobilization Plan (WMP), Vol. I, Annex S; HST/RTP												
28.7.2.1. Contingency vehicles and equipment responsibilities												

GENERAL CONTINGENCY

1. Tasks, Knowledge, And Technical References	2. Core Tasks	3. Certification for OJT					4. Proficiency Codes Used To Indicate Training / Information Provided					
		A	B	C	D	E	A 3 Skill Level		B 5 Skill Level		C 7 Skill Level	
		Tng Start	Tng Complete	Trainee Initials	Trainer Initials	Certifier Initials	(1) Course	(2)	(1) CDC	(2) SC/QTP	(1) CDC	(2) Course
28.7.2.2. Obtain government driver's license												
28.7.2.3. Qualify on contingency vehicles												
28.7.2.4. General purpose vehicles (up to 14,000 GVW)												
28.8. Explosive Ordnance Reconnaissance (EOR) TR: AFI 10-210; AFPAM 10-219, Vol 3 & 4; Army FMs 21-16, 21-75		For Reference Only										
28.8.1. Potential ordnance												
28.8.2. Marking procedures		Document General										
28.8.3. Reporting procedures		Contingency Training										
28.8.4. Mass ordnance clearance												
28.9. Beddown shelters TR: T.O.s 35E-5-6-1, 35E4-132-1, 35E4-94-1; TM 10-4500-200-13; AFI 10-219, Vol 2, 3 & 5		IAW AFI 10-210										
28.9.1. Bare base concept												
28.9.2. Beddown package assets												
28.9.2.1. Harvest Eagle												
28.9.2.2. Harvest Falcon												
28.9.2.3. TEMPER Tent TR: AFPAM 10-219, Vol 2, 5; AFH 10-222, Vol 1; T.O. 35E5-6-1		For Reference Only										
28.9.2.4. Small Shelter System (SSS) TR: TO 35E5-6-11												
28.10. Rapid Runway Repair (RRR) TR: AFIs 10-210, 10-211, 10-212; T.O.s 35E2-3-1, 35E2-2-7, 35E2-5-1; AFPAM 10-219, Vol 4		Document General										
28.10.1. Base Recovery concepts		Contingency Training										
28.10.2. Damage assessment		IAW AFI 10-210										
28.10.3. Damage reporting												
28.10.4. Rapid Runway Repair (RRR) concept												
28.10.4.1. RRR Philosophy												
28.10.4.2. AM-2 Matting												
28.10.4.3. Fiberglass Mat												
28.10.5. Spall Repair												

AFQTP Documentation Record For AFSC 3E1X1

- Download applicable AFQTPs at <http://www.afcesa.af.mil/Directorate/CEO/Training/Enlisted/enlisted.htm>
- Trainers/Certifiers enter their name and initials in the identification block at beginning of the STS
- Upon administering AFQTPs, enter start date in column 4 of this record
- Upon completion of each unit, document columns 5, 6, and 7
- Upon completion of applicable CerTests, trainer will place the completion date in column 8
- Transcribe by entering current date in columns 5 and 8, Trainees & Trainers Initials in columns 6 & 7

1	2	3	4	5	6	7
TASK NUMBER	TASKS, KNOWLEDGE, AND TECHNICAL REFERENCES	* 5 LEVEL * 7 LEVEL ◆ SEE NOTE 1	START DATE	COMPLETE DATE	TRAINEE'S INITIALS	TRAINER'S INITIALS
12.	PIPING/TUBING Ref : AFQTP Module 12 – PIPING/TUBING					
12.4.1.	Fabricate piping and tubing systems	*				
12.4.2.	Install piping and tubing systems	*				
13.	WELDING & CUTTING Ref: AFQTP Module 13 – WELDING & CUTTING					
13.2.2.	Braze and solder	*				
16.	ELECTRICAL Ref: AFQTP Module 16 – ELECTRICAL; HVAC Electrical Troubleshooting and Repair Version 1.0 Mar 00 (CD-ROM)					
16.9.5.	Electrically connect (single-phase and three phase)	*				
16.9.6.	Reverse rotation of electric motors	*				
16.9.7.	Measure motor current draw	*				
19.	BURNERS Ref: AFQTP Module 19 – BURNERS					
19.8.	Adjust fuel/air ratio for proper combustion efficiency	*				

1	2	3	4	5	6	7
TASK NUMBER	TASKS, KNOWLEDGE, AND TECHNICAL REFERENCES	* 5 LEVEL ** 7 LEVEL ◆ SEE NOTE 1	START DATE	COMPLETE DATE	TRAINEE'S INITIALS	TRAINER'S INITIALS
21.	AIR CONDITIONING & REFRIGERATION SYSTEMS Ref: AFQTP Module 21 – AIR CONDITIONING & REFRIGERATION SYSTEMS					
21.3.1.	Locate refrigerants leaks	*				
21.3.3.	Recover and recycle refrigerants from refrigeration and air conditioning systems	*				
21.3.4.	Pump down refrigeration systems	*				
21.3.5.	Pressure check refrigeration systems	*				
21.3.6	Charge HVAC/R systems with refrigerant	*				
21.5.3.7.	Plot pressure enthalpy chart for refrigeration cycle	**				
21.5.3.8.	Measure air conditioning and refrigeration system efficiency using pressure-temperature charts	*				
21.5.3.9.	Calculate and adjust superheat	**				
21.5.3.10.	Calculate subcooling	**				

NOTE 1: ♦ Diamond tasks are extremely important to the career field. Diamond tasks are the same as core tasks with one exception--equipment shortfalls at most locations have created problems with the actual hands-on certification of these tasks. In instances where required equipment is not available for instruction, completion of the task's AFQTP and passing the corresponding CerTest is all that is required for upgrade and qualification training. Hands-on certification should be accomplished at the first opportunity when equipment is available. In locations where the equipment is available for hands-on certification, CerTest completion is still a mandatory requirement.

1	2	3	4	5	6	7	8
TASK NUMBER	TASKS, KNOWLEDGE, AND TECHNICAL REFERENCES	* 5 LEVEL * 7 LEVEL ♦ SEE NOTE 1	START DATE	COMPLETE DATE	TRAINEE'S INITIALS	TRAINER'S INITIALS	CerTest COMP DATE
27.	AFSC SPECIFIC CONTINGENCY RESPONSIBILITIES Ref: AFQTP Module – AFSC SPECIFIC CONTINGENCY RESPONSIBILITIES; Preway Space Heater Version 1.0 Aug 99 (CD-ROM); 150 CU Foot Refrigerator 3E1X1-27.2.2.2 Version 1.0 (CD-ROM); Air Conditioner Bare Base 3E1X1-27.3.2.2.3C) Version 1.0 (CD-ROM); M-80 Field Boiler 3E1X1-27.3.2C Version 1.0 (CD-ROM)						
27.2.1.3.3.	(Tent heaters) Conduct operational tests	*					
27.2.2.2.2.	(150 CF Refrigeration Unit) CerTest # 8065	♦					
27.2.2.2.3.	Service/periodic maintenance # 8066						
27.2.2.2.3.	Conduct Pre-operational test # 8066						
27.2.2.2.4.1.	Using Electrical schematic # 8067						
27.2.2.2.4.2.	Mechanical malfunctions # 8068						
	# 8069						
27.2.2.4.2.	(Bare Base Air Conditioner) CerTest # 8084	♦					
27.2.2.4.3.	Perform operational tests # 8084						
27.2.2.4.3.	Service/periodic maintenance						
27.2.2.4.4.1.	Using Electrical schematic						
27.2.2.4.4.2.	Mechanical malfunctions						
27.2.2.5.2.	(Field Deployable Environmental Control Unit (FDECU)) Perform operational tests CerTest # 8209	♦					
27.2.2.5.3.	Field Deployable Environmental Control Unit (FDECU) Service/periodic maintenance CerTest # 8210	♦					

1	2	3	4	5	6	7	8
TASK NUMBER	TASKS, KNOWLEDGE, AND TECHNICAL REFERENCES	* 5 LEVEL * 7 LEVEL ◆ SEE NOTE 1	START DATE	COMPLETE DATE	TRAINEE'S INITIALS	TRAINER'S INITIALS	CerTest COMP DATE
27.2.2.5.4.1.	(Field Deployable Environmental Control Unit (FDECU); Troubleshoot) Using electrical schematic CerTest # 8211	◆					
27.2.2.5.4.2.	Field Deployable Environmental Control Unit (FDECU): Troubleshoot) Mechanical malfunctions CerTest # 8212	◆					
	Field Boilers (M-80) CerTest	◆					
27.3.2.3.	Perform operational tests # 8055	◆					
27.3.2.4.	Service/periodic maintenance # 8056	◆					
27.3.2.5.1.	Using electrical schematic # 8057	◆					
27.3.2.5.2.	Mechanical Malfunctions # 8058	◆					
	# 8059	◆					

SECTION B - COURSE OBJECTIVE LIST (COL)
(This section used when developing lesson plans)

4. Measurement. Measurement of each objective is indicated as follows:

4.1. Written Test (W) - used to sample each knowledge objective and the knowledge components of performance objectives.

4.2. Performance Test (P) - used under specified conditions in a formal testing mode to measure student accomplishment of performance objectives after the teaching-learning activity has been completed.

4.3. Progress Checks (PC) - administered by the instructor during classroom or laboratory instruction time to assess the student's accomplishment of knowledge or performance objectives.

5. Standard. The standard is 70% on written examinations. Standards for performance measurement are indicated in the objectives and delineated on the individual progress checklist. Instructor assistance is provided as needed during the progress check, and students may be required to repeat all or parts of the behavior until satisfactory performance is attained.

6. Proficiency Level. Most task performance is taught to the "2b" proficiency level which means the student can do most parts of the task, but does need assistance on the hardest parts of the task (partially proficient). The student can also determine step-by-step procedures for doing the task.

7. Course Objective List. These objectives are listed in the sequence taught by Block of Instruction.

7.1. Initial Skills Course. A detailed listing of the initial skills course objectives may be obtained by written request to 366 TRS/DO, 727 Missile Road, Sheppard AFB TX 76311-2254.

7.2. 7-Skill Level Course. A detailed listing of the CE Craftsman Management course objectives may be obtained by written request to 366 TRS/DO, 727 Missile Road, Sheppard AFB TX 76311-2254.

SECTION C - SUPPORT MATERIALS

8. CerTest.

8.1. CerTest is a program that uses computer-based evaluation to ensure skilled craftsmen are available to meet the Air Force's changing needs. It enhances upgrade and qualification training by testing and evaluating an individual's knowledge of the principles and procedures in each specialty.

8.1.1. The program contains tests used evaluate task knowledge received through different media such as paper products (text), videotapes, and computer-based programs.

8.1.2. The CerTest program contains **mandatory** tests, required for upgrade. All **diamond** (♦) coded tasks on the STS have a corresponding **mandatory** test.

8.1.3. CerTest is also a powerful training management tool. It can be used to find the strengths and weaknesses in an individual's training and experience. CerTest automatically records and updates all test results. The training manager can copy records to a disk so that an individual can bring current, accurate training information to a new unit; thereby helping the gaining supervisor evaluate the trainee's knowledge and experience.

8.2. CerTest also enables unit personnel to develop site-specific tests. These custom-made tests standardize testing on tasks unique to a specific duty station and/or assignment. The program contains a graphics library that may be used along with a menu-driven test editor to develop these site-specific tests.

8.3. CerTest also contains **optional** CDC pre-evaluation tools. Volume review exercises are available for progress checks after each volume is completed. After all volumes are completed in a set, the trainee may take the course review exercise before taking the final End of Course exam at the base training office. Commanders are encouraged to integrate these tools in their unit's OJT program.

8.4. CerTest has been adopted as the Air Force platform for future electronic CDC testing. The Air Force Institute for Distributive Learning (AFIADL) began using CerTest on 1 June 2000. Currently, all CE AFSs are allowed to use AFIADL's CerTest on installations where Base Test Control Facilities (TCFs) are equipped. See your UETM for further information.

8.5. The **mandatory** CerTests for each AFSC are identified, by number, with it's corresponding AFQTP on the 3E1X1 AFQTP Documentation Record.

8.6. For a complete list of up-to-date AFQTPs applicable to the 3E1X1 AFSC see our web page at: <http://www.afcesa.af.mil/Directorate/CEO/Training/Enlisted/QTPs/3E1X1.htm>

SECTION D - TRAINING COURSE INDEX

9. Purpose. This section of the CFETP identifies training courses available for the specialty. Refer to the Education and Training Course Announcements (ETCA) web site, <https://etca.randolph.af.mil/> for complete information on Air Force in-residence courses.

10. Air Force In-Residence/Mobile Training Team (MTT) Courses.

Course Number	Title	Developer
J3AZR3E151 013	HVAC/R Control Systems	366 TRS
J3AZR3E151 014	HVAC/R Direct Expansion Systems	366 TRS
J3AZR3E151 015	HVAC/R Indirect Expansion Systems	366 TRS
J3ACR3E070 000	Civil Engineer Management Craftsman Course	366 TRS

11. Air Force Institute for Advanced Distributed Learning (AFIADL) Courses.

Course Number	Title	Date
CDC 3E151D	HVAC/R Journeyman	1 Jun 02
CDC 3E151E	HVAC/R Journeyman	1 Jun 02
CDC 3E151F	HVAC/R Journeyman	1 Jun 02

12. Exportable Courses/Information.

Course Number	Title	Date
	Civil Engineer Management Craftsman Course – Part A (exportable) version 2.1	Jul 01

13. Courses Under Development/Revision

Course Number	Course Title	Date Due
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SECTION E – MAJCOM-UNIQUE REQUIREMENTS

- 14. “There are currently no MAJCOM unique requirements. This area is reserved.”**

SECTION F - HOME STATION TRAINING

15. Purpose. The purpose of this section is to identify the tasks, training references, and training sources available in support of contingency/wartime training. Training ranges from knowledge-type training conducted in a classroom to task-oriented (hands-on) training conducted in the field. These training requirements, frequencies, and sources are listed in AFI 10-210, Prime Base Emergency Engineer Force (BEEF) Program.

15.1. Home Station Training (HST). HST is training that is conducted at the individual's home station for contingency operations.

15.1.1. Category I (CAT-I) training consists of knowledge-level training such as Prime BEEF orientation, field sanitation, and expedient methods. CAT-I training is normally accomplished through briefings and the use of videos and other training aids. These various training aids are listed in AFI 10-210, Attachment 2 under the "Optional Source for Training Material" column.

15.1.1.1. The "General Contingency Responsibilities" (GCR), CD-ROM Training Package may be used for Category I contingency training. Successful completion of the lessons in the GCR CD-ROM will satisfy those SORTS requirements indicated in AFI 10-210, Chapter 4 and Attachment 2. It can be used for training and evaluation and is based on successful completion of one or more lessons completed in any order. One, some or all lessons may be completed at a given time. At the end of each lesson, the trainee will successfully complete the Lesson Review Exercise (LRE) and receive a certificate of training generated by the CD-ROM. The trainee must present the certificate or certificates to the Readiness Training Monitor to receive credit for the training.

15.1.1.2. Also available are various volumes of Home Station Training CD-ROM packages. These disks contain up to five presentations covering various CAT I topics. These are an additional method of providing required recurring training and topics covered are indicated in the training material column of Attachment 2 by the letters "PBCD".

15.1.1.3. For personnel assigned to a unit with a Prime BEEF mission for the first time, the 3-Level General Contingency Responsibilities CD-ROM is to be completed within the first 90 days of assignment. This product contains 17 lessons covering CAT I training topics. CAT I credit can be given for completion of these lessons for the same areas as the previously mentioned General Contingency Responsibilities product as indicated in AFI 10-210. Completion certificates should be presented to the Readiness Training Monitor for documentation of training.

15.1.1.4. The Unit should develop procedures to use these products to suit their needs. Remember these are tools to assist you in fulfilling CAT I training requirements. Document this training as outlined in AFI 10-210.

15.1.2. Category II (CAT-II) training is primarily task-oriented training such as weapons training, hard-back tent construction, and convoy security and the hands-on portion of various CAT I topics. This training is listed in AFI 10-210, Attachment 3 can be conducted during regularly required field training exercises.

15.2. Training References.

15.2.1. AFI 10-210, Prime Base Engineer Emergency Force (BEEF) Program.

Chapter four of AFI 10-210 identifies the Prime BEEF recurring training requirements. You can review this document by going to the Air Force publications web site. Attachment 2 is a list of HST CAT-I training requirements and Attachment 3 lists CAT-II training requirements.

15.2.2. Prime BEEF Contingency and Wartime Tasks - AFPAM 10-219, Vol 10.

The Contingency Training Guide and Task Standards (AFPAM 10-219, Vol 10) lists basic wartime skills, knowledge, and the major common contingency/wartime tasks that Prime BEEF teams will be required to perform. The Contingency Training Guide and Task Standards identify the AFSs associated with each task, required resources to accomplish the task, and the maximum time (under optimum conditions) expected to complete the task. The document also identifies the lead AFS on each task. This document is located on the Air Force Publications Web site.

15.2.3. AFPAM 10-219 Series. These documents assist in home station training and contingency responses. They replaced the AFP 93-12 series of planning documents and are available on the Air Force Electronic Publications Library (AFEPL).

15.2.4. Air Force Education and Training Course Announcements (ETCA).

Superseded AFCAT 36-2223. It is located at the following URL:

<https://etca.randolph.af.mil/> lists additional training/educational opportunities available for civil engineer personnel. This catalog contains information on formal education and training courses. The catalog is updated quarterly.

15.2.5. Readiness Training Package (RTP). RTPs are lesson plans for HST lessons. The RTPs are intended for those personnel who teach any area of HST. The index and RTPs are located on the Air Force Civil Engineer Support Agency (AFCESA) home page. The internet address for this information is <https://wwwmil.afcesa.af.mil>.

15.2.6. Other Documents. AFH 10-222, Bare Base Development, Bare Base Facility Erection, Force Protection, Mechanical Systems, Bare Base Assets, Bare Base Generators and other volumes in the AFH 10-222 series are used for contingency training and operations. The AFH series are pocket guides providing information on bare base systems for all AFSs. AFH 10-222, Vol 4, Air Force Environmental Handbook for Contingency Operations, was developed to assist the environmental career field (3E4X3) on environmental quality issues during contingency and training operations. The handbook can be used by any AFS who works closely with environmental issues. Visit the Air Force Publications web site to down load this information.

15.2.7. AFCESA/CEX. Maintains a comprehensive listing of audiovisual products that support the contingency training program. To view this listing as well as gain information on how to order specific audiovisual products, please consult the AFCESA Contingency Support page.

15.3. Ancillary Training.

15.3.1. Team Exercise Sites (CAT III). All CE personnel who fill critical Unit Type Code (UTC) positions will receive team training at Silver Flag Exercise Sites (SFES) with the exception of members on headquarters staff augmentation UTCs, pavement evaluation UTCs, and generator repair and maintenance UTCs. There are currently three active SFES in the world today. They are located at Tyndall AFB, FL; Ramstein AB, Germany; and Kadena AB, Japan. Active duty personnel in critical UTC positions will be qualified at least every 30 months on the elements listed in table 4.3 of AFI 10-210. The Air Reserve Components (ARC) will be qualified at least every 45 months.

15.3.2. AEF/Spin-up Training. The AFCESA home page has the worldwide locator for the different types of training, locations, and Points Of Contact (POC) for equipment items that maybe encountered during contingency operations.